

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

Vol. XXXVII
No. 20

NEW YORK, NOVEMBER 15, 1917

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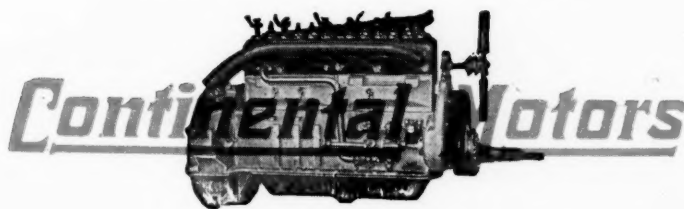
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NEW YORK—THURSDAY, NOVEMBER 15, 1917—CHICAGO

No. 20

Manufacturing Restriction

Because of Alleged Steel Shortage

Now Less Imminent

War Industries Board, Starting a Thorough Investigation,
Takes Very Favorable View of Industry

WASHINGTON, D. C., Nov. 14—While no official announcement directly concerning the War Industries Board with relation to alloy steel and the automobile industry has been made since the meeting with the automobile industry and the appointment of the automobile committee, it is now almost certain that the War Industries Board is taking a really favorable view of the industry and that there will not be that restriction due to steel shortage which was at first intimated. The board, through J. F. Replogle, director of steel products, has set in motion what would seem to be the necessary machinery to get together all facts with regard to the steel industry, steel production, government requirements and steel statistics in general so that before any future restriction of steel shipments is even considered by the board it will have all of the facts in the case. This is really what the automobile industry demanded at its hearing on Nov. 2.

Investigation by Committee Started

The new committee representing the automobile industry, composed of Messrs. Copland, Lee and Chalmers, has, in addition to establishing its head-

quarters in the Munsey Building, gotten under way with its official representation of the industry with the government, its duties including investigation of factories to learn of idle capacity and report findings.

The bringing of information gathered by this committee to the attention of the War Industries Board will be through H. L. Horning, chairman of the Automotive Products Section of the Council of National Defense, who has been made the accredited representative of all automotive matters by the War Industries Board. He will confer with the automobile committee and in turn with the War Industries Board.

Harmonious Work Is Essential

It now seems that it is up to the automobile committee to work in perfect harmony and represent the automobile industry as it should be honestly represented in this case. Although this committee has only been in operation a few days there is much feeling that the automobile industry is not presenting itself as a unit before the government as it should in an exigency such as this. If undertone is true there seems to be, instead of a united automobile

The Committee Appointed to Represent the Automobile Industry



M. A. M. Representative
A. W. Copland (Chairman)
Detroit Gear Co.



John R. Lee
Ford Motor Co.



N. A. C. C. Representative
Hugh Chalmers
Chalmers Motor Co.

front, what might be described as three factions of the industry, each one of which is endeavoring to save itself, and this without much apparent regard to the other two. While there has been no definite evidence on the surface of such action, there have been unmistakable indications that such is taking place. Nothing could be more disastrous to the present situation.

One of these divisions might be designated as those manufacturers who feel that there will be a shortage of their particular brand of alloy steel and as such they are apparently making special offers to the government to take over their entire plants for munition work and at the same time placing upon them a halo of patriotism and incidentally giving the impression that those not so turning over their plants should be looked upon as not just as patriotic as the day calls for.

Where Different Steels May Be Used

There is a second division of manufacturers whose factories are busy and who see no crisis in a possible restriction of alloy steels due to the fact that their design makes it possible to generally substitute carbon steels for alloy steels. This group of the industry naturally opposes any restriction of it and refuses to be classed as unpatriotic. Rather it considers itself one of the great essentials of war times and has no thought of lack of patriotism in not offering its factory, but rather considers it would be an economic mistake to restrict its production when there is no necessity and when reports show that there is more steel now available than can possibly be fabricated within the next four months.

The third division is that whose business has dropped off very perceptibly for the last several

months and who would prefer their factories to be given over entirely to munitions or other government work. If this could not be done several of these factories would have to face bankruptcy. If these factories take the selfish view of the situation they might welcome restriction of steel shipment to automobile industries. It would benefit their individual case, but such action could neither be considered patriotic nor constructive. Individually the best treatment for them is government work.

Special Legislation Unnecessary

With this triple division of automobile manufacturing sentiment it is super-necessary that those strong elements of the industry, and those strong factories, do not be legislated against for conditions that cannot be laid at their door.

The situation is one that does not call for special legislation affecting the whole industry but rather a working out of conditions as war times will eventually work them out. It would be an error to legislate for the entire industry because of conditions faced by Division 1. It would be an error to legislate for the entire industry because of conditions faced by Division 3. What would seem to be a healthy division, and one that does not warrant any restriction, should not be made to suffer because of conditions faced by Divisions 1 and 3.

One Division Should Not Hamper Another

It is most unfortunate that Division 1 should be talking to the government in language that suggests the curtailment of the entire industry. One large manufacturer in this class predicted some days ago that within 3 weeks the automobile makers would

all be out of business. This maker was apparently faced with a shortage of steel needed in his product, and it was best for his individual needs to talk in this way and have his factory entirely taken up on government work, as he could not substitute carbon for other alloy steels in his car.

It is most unfortunate that another group of manufacturers represented by Division 3 should visit Washington and urge the issuance of an order whereby they would be forced to give over a part of their plants to government work, meaning continuous business with fair profits as compared with slack factories at present. Many in Washington declare that these makers are responsible for the recent trouble; and automobile manufacturers represented by Division 2 have been compelled to come to Washington and defend their prosperous industries because of the representations of these makers who are slack.

Is Such Criticism Just?

How is it possible for the War Industries Board to be criticised for what might be termed hasty action in restricting steel shipments if two divisions of the industry are really urging it? Fortunately the facts are seeping into those in control on the War Industries Board. Fortunately, in fields outside of the automobile industry the question of essential industries is being very much discussed. Fortunately the War Industries Board is learning that there are prosperous and non-prosperous in industries, and that rulings cannot be made with regard to a whole industry on the solicitations of the non-prosperous. Fortunately the War Industries Board is recognizing that it would be a great economic mistake to legislate for an industry when such legislation would damage the healthy portion and simply convert the weaker portion into other lines of industry that it should follow without such legislation.

In face of the many conflicting facts it seems impossible to put through any plan that would attempt to restrict the activities in all automobile factories should necessity for such really arise because of steel shortage. Such restriction would be an unsound policy. There is no reason to restrict the maker of a satisfactory car using carbon steels solely because another maker uses alloy steels which are needed for other uses. There is no reason why the healthy should suffer because of the weak. Blanket restriction or legislation is not economically sound.

Some Manufacturers Were Wise

Some manufacturers, because of their foresight in design and selection of a selling field, merit the excellent war time business they are now doing and we should not envy their feasting on cake while those who have not been so fortunate in their selection of a product and field should not be jealous of

their rival's success. Some must have cake while others have bread. In these war days the essential and the efficient stand out in more striking contrast than in peace times, and blanket action regarding an industry would undoubtedly be an economic error.

We believe the War Board is facing a new situation in a clearer and more definite way than was thought possible a week ago. We should like to analyze the situation further for its benefit by asking the board the following questions:

These Questions Must Be Answered

Supposing, members of the War Industries Board, that within the next several months you destroy many non-essential industries, so called, in order to manufacture shells, cannon and many other war needs—and when you have destroyed these industries and shifted workers and ruined many plants that have taken years to build, you suddenly find the shipping yards of the seaboards gorged with loaded freight cars filled with these goods with no bottoms to take them to Europe and no warehouses to store them in?

Supposing, after the various committees making purchases, the Allied purchasing commissions, the War Department, the Navy Department and all the various branches of the government have completed their purchase contracts these goods arrive in the East and cannot be shipped because of lack of shipping bottoms? What will be the result? Discouraged workers? Loss of spirit among makers? Ruined factories? Loss of products? And much censure for the officials responsible? Very likely.

The members of the War Industries Board have at all times shown themselves willing to listen to advice and suggestions, particularly, from friendly sources. This paper, counting itself extremely friendly to the Board, offers the following suggestion:

Should Make This Investigation

1. Investigate the amount and time of every purchase order contract placed by every purchasing division in the United States and Allied governments.

2. Determine the exact amount of shipping bottoms that will be available when all of these goods purchased will be ready for shipment.

3. Compare the amount of available shipping bottoms planned for 4 months hence, and their tonnage, with the amount required to ship all of the supplies and other goods that will be ready for shipment 4 months hence.

From investigation, this paper believes the board will find that three times as much goods have been ordered as can be shipped, and that if the motor car plants are now ordered to cease manufacture of passenger cars to make munitions or to allow outside manufacture of munitions from the steel thus saved, the industry will have been injured uselessly, foolishly and for naught.

President Wilson Calls for National Co-operation

America May Face Labor Shortage—Must Increase Quantity and Quality of Labor—England's Success in Keeping Industries Alive Traced to Keeping Skilled Men on Skilled Work

THEREFORE, my counsel to you is this: Let us show ourselves Americans by showing that we do not want to go off in separate camps or groups by ourselves, but that we want to co-operate with all other classes and all other groups in a common enterprise, which is to release the spirit of the world from bondage.—*President Woodrow Wilson.*

AMERICA is in greater danger of a shortage of labor than of a shortage of material. Shortage of labor will become evident when the scheduled output of direct munitions of war is in full swing in a few months' time. America will have to economize her skilled mechanics by using the lowest grade of labor possible for every job, because the skilled men are scarcer than the unskilled.

It is for this reason President Wilson's appeal to the American Federation of Labor extends so directly to every man and every woman in the United States. Unity of purpose for the good of America and for the world must come before everything else. By work, by steady *uninterrupted* work, we must win this war. That is the President's message.

Employers and employees with very few exceptions already have the spirit the President wants to find in them. We are passing now through a most difficult period, one that every nation at war has had to face. We shall benefit by their experiences, and the American ability to think and act rapidly will help to shorten the time of reorganization; the change over from peace to war.

Such are the opinions of the British mission from the Ministry of Munitions which has just completed a two months' study of conditions in the United States.

The mission has visited America for the purpose of telling the government and manufacturers how England handled the problem of labor shortage. In a word, it was done by the patriotism of labor and capital. The former agreed not to strike, the latter not to compete for labor against each other. The former had their rates of pay fixed by law, the latter had their profits limited. Neither capital nor labor could benefit largely from the war.

The steps were, first, agreement between capital, labor and the government, and second, legislation in precise accordance with the agreement. Very little use has been made of the new laws; the thing which has enabled the output of war essentials and also of other things to be maintained has been the spirit of co-operation, the rea-

lization by all that they had to work *for the country only* till the war was won.

Women are doing 80 per cent of the work in munition factories and a large proportion in other plants. These women are appreciated by employer and labor alike. Their ability has been the greatest surprise of the war. A large proportion are women who would not be in factories were it not war time. They are a high grade of women from the educational viewpoint. They are being paid the same rate as the men at the request of the men.

The British government has pledged itself to the labor unions that their rights which they have surrendered for the duration of the war shall be restored to them in full at the war's conclusion.

It might perhaps best be explained by saying that the whole country has entered into a gentleman's agreement to think and act and work for output only. That every man and every woman shall receive sufficient pay is cared for, the rates being raised as the cost of living rises.

America's Problem Similar

Speaking to the labor men at Buffalo, President Wilson has made an appeal on much the same lines as the British government's appeal in 1915. He has also stated in unmistakable terms that capital is to be treated as a unit with labor; that what the one may be asked to surrender the other will be asked to give in equal measure. The President's speech is a call to the industry of this country to get together, to consolidate all branches with the one idea of winning the war.

All the British legislation applies to munitions work alone, but the term munitions includes everything which has any bearing on the war. In effect, the numerous industries which are being kept alive in England are under the same rules, only there is no law behind the agreement to pull together.

England's non-essential industries have ceased to exist only when they depended upon one of two things: materials absolutely essential for purely war products, or labor similarly essential. An industry which normally

employed perhaps mainly skilled mechanics is allowed to retain a minute percentage and must make up the balance with women or men who are neither skilled nor fit for military duty.

All skilled men of military age are enrolled and are excused from military duty as long as they continue on munitions work or have permits to engage in other work. These men are not part of the military establishment, they remain civilians and are not "conscripted," they are merely liable to be called if they neglect their industrial occupations. This gives the power to control the few men who can work but will not. Their numbers are so small as to be negligible, however.

Long Hours Not Good

When England awoke to the desperate condition of the munitions supply in the end of 1914 she had to call upon labor to work desperately long hours; some men worked 120 hours a week for months. This was effective in obtaining an immense output for a short time, but it soon wore out everybody. Now it is only on exceptionally urgent work that more than 60 hours are worked, including overtime. The regulation varies from 52 to 54 hours regular time and the overtime seldom exceeds 4 or 5 hours. No Sunday work is done except in plants with continuous operations, such as some of the explosive plants. This gives a larger output than longer hours. Just as the soldier must have his periods of rest from fighting, so must the civilian have his rest from labor if his efficiency is to be maintained.

Why a Shortage?

Seeing the vast dimensions of America's manufacturing industry a labor shortage for engineering work sounds unlikely, but the reason for anticipating it is that the call for munitions is always increasing and that the army needs a great number of skilled mechanics. The plans for production of guns, of shells, of tanks, of motor trucks, of railroad material, of bridges, of ships, especially of ships, that are made to-day will be increased rather than decreased. The more material the armies can have the quicker will they win the war. There is no limit to the weapons they can employ; they want always the absolute maximum of munitions, and the ships to carry them, that can be produced. With every big gun must go a few skilled men to keep it in order; with every tank must go a number of skilled men to handle and repair it; with every airplane still more men. Thus increased production of munitions brings with it increased demands from the army upon the skilled man power of the country. Sudden calls for 10,000 or 50,000 men for some special engineering job behind the lines are common.

It is not possible to train skilled men rapidly, but it is possible to train unskilled men and women to do a large proportion of the work formerly done by skilled alone. For example, in gage making, England is employing women to make, harden and grind gages to within a half thousandth, only the finishing touch being given by the skilled man who would formerly have made the whole gage. England has had much leeway in this respect, because she was far behind America in the use of automatic machines and labor saving devices. In British automobile factories nearly all the labor was skilled, while in America it has been nearly all unskilled. This means that America is already using her skilled men much more efficiently than Europe did before the war and so has a smaller proportional reserve to draw upon. It will be just so much harder to replace the skilled men in that while Europe helped herself out by copying American methods of manufacture, America, with no one to copy, must excel herself.

The picture sketched by the British mission of conditions of industry in England is not that of a conscripted country. The organization which has made production on a gigantic scale possible has not spelt discomfort to all and sundry. It has not crippled industries classed as non-essential because of two things, one the natural decline in demand for true non-essentials and two, the instinctive turn over of the equipment and the personnel of non-essential industries to essential ones. This has covered the whole gamut. From the stockholders to the smallest retailer of the product, industries have swung over to some phase of war work, the balance left being the essential portion. Thus the sale of dry goods has decreased to civilians. The dry goods factories are producing for the armies, the staffs of the retail establishments have shrunk, the men going to the army or to munition factories, the women to factories or hospitals. Enough are left of the older people and the unfit for hard physical work to carry on the business in accordance with the shrunken public demand. With these are found a sufficient number of men who could be useful on other work, but without whom the industry could not keep its wheels turning.

Where a business man has lost one thing he has gained another. For example, automobile dealers are now the backbone of tractor farming. That is the job which war has brought to them. They have lost many men to the army. Military transport recruited largely from their ranks, and their private trade has dwindled. Organized tractor work and organized road transportation have provided work for the buildings and equipment and for the remaining personnel. The change over has been slow and not disruptive.

Population Not Stinted

On the other hand, the civilian population is not stinted of anything it desires except of the things which need ships to bring them to England. The restrictions on the use of passenger cars were due to nothing except the impossibility of getting enough gasoline for even all the military requirements. There has been reduction in the output of such things as fictional magazines, but the supply is equal to the demand. Had there been plenty of fuel, reduction in the sale and use of automobiles would only have been in proportion to the naturally decreased demand of a country with many of its men in the army.

This means that in England an industry classed as a non-essential must not *compete with* an essential one for labor or materials, but that nothing is placed in the way of it obtaining substitutes for either; in fact, if it can do this it is allowed just enough skilled help to make its continuance practical.

American Resources Sufficient

The resources of America in both labor and materials are enough to prevent hardship to any industry *provided that industrial warfare is avoided*. The leader of the British mission, Sir Stephenson Kent, said that had England suffered in the past two years the same amount of disorganization which he had seen in America in the last two months, she would have had to sue for a disgraceful peace.

This is a big statement, but while it should cause concern in the minds of those who are looking forward it has also its hopeful side, for it shows that the resources of the country are enough to prevent chaos even with such an enormous handicap. England has learned factory method from America, is even now behind America in many ways in this respect, but America can learn from England how to get the best out of *herself*.

Keep the Automobile Industry on an Even Keel

The Dominant Thought Must Always Be "The Motor Car Is An Essential Product"

IN order that the automobile industry may operate with stability and calmness and at the same time serve the government in a big way there is great need for cool leadership and intensive promotion work.

Each individual and corporation must do the utmost to instill into the industry from top to bottom two ideas:

1—The motor car is an essential product.

2—With the new governmental co-operative plan there is prospect of every dealer getting cars to sell and of the factories keeping their regular work going on a near-normal basis.

Each factory should consider well what work it can do among its dealers. There should be letters going out, bulletins on conditions with all bombast and exaggeration eliminated, personal contact with dealers wherever possible, and real, intensive busi-

ness planning and co-operation that will show dealers the manner in which they can help in the big movement.

Not all factories can call a convention at this time, but each can begin now the preliminary work that will assure the idea's being put over in a successful way at the show-time meetings. Hupmobile held a convention in Detroit Nov. 5 and 6 because it has changed its contract period and has a new model. This convention helped the dealers. They were given confidence in the industry as a whole. They were sold on the essentialness of the motor car. They all went home workers for the future stability of the industry so far as it does not interfere with our country's welfare.

At all dealer meetings there should be talks on the right subjects. Two of those given at the Hupmobile meeting follow:

How Hupmobile's General Manager Summed Things Up for the Dealers

I THINK you will all be interested in a short summary of the meeting of motor car and accessory manufacturers held in Washington last week, largely as a result of the newspaper talk of immediate reduction of some 40 per cent of the output of motor cars.

This meeting was attended by some of the largest manufacturers in all lines, including one or two steel representatives. It was stated on authority that Government needs and commercial needs in alloys and steel were practically all taken care of by judicious distribution of the output.

The needs of the motor car industry were placed at about 5 per cent of the total output.

There is a shortage of some alloys, but it was reported that this shortage was in the way of being taken care of very promptly, largely depending on ocean transportation.

The Government has many thousands of tons of fabricated steel lying in warehouses and on dock, which authorities say cannot be used, much of it, for from six to eight months. The proposition was made and unanimously adopted at the meeting to—

1—In the first place, offer the service of the motor car industry to the Government to any amount of its means.

2—In the second place, request from the Government a budget showing what the needs were.

3—In the third place, form a Committee of three of the strongest men in the industry to be permanently stationed at Washington, their service to be at the disposal of the War Industries Board, to formulate a systematic method of han-

dling all the Government's needs that can be taken care of by the automobile and accessories people; to determine which needs could be handled to the best advantage by any member of the industry and to distribute the work accordingly; to ask that the Government Committee TAKE NO ACTION affecting the output of the manufacturers WITHOUT FIRST CONSULTING WITH THIS COMMITTEE.

The board was unable to furnish a budget for the reason that they have nothing of the kind. Each department of each committee was apparently working on its own hook, placing orders wherever they can see a way to pry in and, in many places, placing them very disadvantageously for the Government in the way of prompt and economical production.

A concentration of these needs and the apportionment of the work by the Automobile Committee will largely obviate and perhaps entirely do away with this dangerous and expensive method.

The War Industries Board welcomed the suggestion of the committee and asked how soon the committee would be on the job. Our spokesman suggested the next morning, which, I believe, was the fastest move that Washington has seen since the beginning of the war.

In regard to the request that no action affecting the industry be taken without first consulting the committee, the board stated that they could not tie their hands in any way that would prevent them from taking prompt and immediate action in the case of an emergency, but that they are very anxious to refrain from any action which would be detrimental to the welfare of the industry, and unless an

emergency should arise, that consultation would be had before taking any action.

The committee is now being formed by the presidents of the two associations, and will consist of three men who will undoubtedly be very strong men, and I am positive will work to the great advantage of the Government and *certainly to the relief of the automobile manufacturers* who are now suffering from a multiplicity of ill-founded newspaper talk more than from any other cause.

There is one feature that we should bear in mind. The average man, whether he be merchant, manufacturer or professional man, believes that the automobile business is one of enormous profits and a great many of them regard it as strictly a luxury.

The opinion is expressed over and over that the industry should absolutely be PUT OUT OF BUSINESS.

One of the leading attorneys of this city, talking to me coming home on the train, referred to this feeling. He is a man that is thoroughly versed in the automobile business, being the attorney of the largest company in the world and a man who spends a great deal of his time in Washington. He was talking with a well-known business man from the East who is on one of the commissions, and this man expressed the opinion that *the automobile business should be wiped out*. The attorney said:

"My dear sir, if you wipe out the automobile manufacturers, you will wipe out a great many thousand dealers whose only means of existence is the selling of automobiles—you will wipe out innumerable factories that could not stand the financial conditions resulting from a suspension of their work. When you wipe out all these industries you wipe out the ability of these people to pay taxes to the Government. You produce a bread line where no bread line is necessary. Your argument that these factories can take on other work is wrong, because they will not be in existence. A bankrupt concern cannot take on work."

The Eastern man replied:

"It makes no difference if we break every industry in the country. We must win the war."

The attorney said:

"I would not talk with a damn fool any longer."

That is the frame of mind of a great many men occupying positions of prominence and influence at Washington and, in fact, all over the country at the present time.

It would be foolish of us not to recognize this fact and be ready at all times to combat it.

Each one of you gentlemen is a power in his own territory, and you are not doing your duty by yourself, by this corporation or by the business at large unless you *take every opportunity to combat this talk of PLEASURE CARS*.

Mr. Drake yesterday spoke of an impromptu talk at luncheon by a man who is the head of the work being done on the standard truck. I wish I had verbatim these remarks.

It was the greatest short sermon on the value of the passenger car in the present crisis that I believe anybody could

put out. One sentence stuck out above all the rest and has remained in my mind ever since. He said:

"Gentlemen, what is an automobile for? It is for transportation service.

"What difference is there between a truck and a passenger car? Absolutely none whatever except occasionally in the material that it is carrying."

I think you might all stick that in the back of your head and put it out on every possible occasion.

There will without any doubt be numerous attacks on our business. The automobile manufacturers through the National Automobile Chamber of Commerce are in touch with the situation at all times. I think they are all alive to the necessities of the situation and you will be advised in the future, as you have been in the past, when prompt action occurs.

Bear in mind, you dealers, that you are as a body a thousand times more powerful to direct legislation than the very few automobile manufacturers. Use your power every chance you get. It is a matter of self preservation.

Now in regard to the talk of the reduction of the product. I think in many cases this reduction will take place.

The very attitude of mind that some of the manufacturers have gotten themselves into will affect their own product.

Take yourselves: If you had a contract for one hundred cars and made up your mind that you would only get sixty, it is a cinch you would let down in your work because you would only require 60 per cent of your effort to sell your allotment.

So with the manufacturer. If he has arrived at the conclusion, as some of them have, that their output is going to be restricted, *I believe that the result is inevitably a restriction of that company's output.*

I am absolutely certain that many companies are going to be restricted by reason of the quality of their product. Still others will be restricted by reason of their financial status. The banks are not going to be as liberal this year as they have in the past. Again other companies who have been having hard sledding will restrict their own product by taking on other work.

Gentlemen, if the crisis comes, and, as our friend from the East says, it is necessary to bankrupt the whole nation to win this war, *we will all go down together.*

Now I do not mean to say that. **WE WON'T GO DOWN!** We will meet the emergency when it comes and will go ahead and do business—maybe some different business or in a different way. But a year from now, when we have our next annual convention, *I believe we will all be here together.*

Profits may be cut down. Taxes are high. There never was a time in the world when there was so much money available. The country is tremendously prosperous.

There are spots here and there where conditions are not as desirable as they might be, but as near as I can tell from what I have heard in my talks with you and from all over the country, there seems in almost every case, *where one factor is disappointing, other factors are making it up.*

What Hupmobile's Sales Manager Told the Dealers to Do

IN arranging the program for this convention, we have endeavored to make it of value to you by giving you the fullest possible information regarding our manufacturing, advertising and selling plans, that you may be better prepared to go back to the firing line and open up your campaign for increased Hupmobile sales.

The success of the Hupp Motor Car Corporation depends entirely upon our ability to market the product, and when I say "our" ability, I mean "your" ability, plus the sincere, earnest co-operation and assistance of this sales department.

Our product is not sold until it reaches the consumer through the mediums of the distributor and the dealer, and we must look to the user as the one who really pays the freight.

It is the individual buyer that pays for the automobile, and we look upon you men, not alone as so many valuable cus-

tomers, but as the most vital, the most important part of our sales organization—the channels through which our product reaches the owner.

It naturally follows that the more individuals that can be solicited, the greater number of sales can be made.

It is also obvious that the greater the number of people that can be interested the more thoroughly the territory can be developed and made profitable.

In the State of North Dakota, for example, there were 38,000 motor cars registered on Jan. 1 last. Of this number 18,000 were Fords, leaving a balance of 20,000 cars of other makes.

If it were possible for the sales representatives of Hupmobile dealers to have called upon each one of these 20,000 buyers, what do you suppose our sales in that State alone would have been?

If only 5 per cent, and that is a conservative estimate, had bought Hupmobiles, that would have amounted to 1000 cars.

Of course it is folly to even consider the possibility of calling on *all* the buyers in your territory, but each of you should increase your dealer's organization so that a greater number of prospects may be seen, and sales are bound to follow.

Right now, with this new Series R car, the best value we have ever offered, is *the time to make the analysis of your territory. Don't wait until you have had another year's experience, and lost business in sections where you are not properly developed. Survey and study your territory thoroughly—know conditions.*

As to just how to go about to obtain this increase in business, you must first make a careful survey of your territory, picking out the towns and cities where dealers should be appointed, and where business can be obtained.

Salesmen Should Be Called Into Conference

Your salesmen should be called into conference frequently to discuss territorial and general conditions. You should put it up to your territory men that you are depending upon them to increase your volume of business through securing more dealers and making your present dealers more efficient by co-operation and assistance.

Don't let the matter rest upon one such talk or conference, but hold sales meetings frequently.

Get your men together once a week or twice a month, and go over the different points where dealers have not been obtained and find out what is the matter, and overcome what objections may have been raised.

Make your salesmen a part of your organization. See that they are thoroughly familiar with the new car, and see that they are themselves sold. The new catalog, which in reality is a salesman's manual, should be read and re-read and practically learned by heart by your salesmen, so that they may be better prepared to answer every possible question that may come up, and to properly present our proposition.

There is no short road to successful salesmanship.

If your men work intelligently, systematically, and do not misrepresent, they are bound to obtain satisfactory results. Personality has a great deal to do with successful salesmanship.

The man who has a certain amount of magnetism, if you please, or the ability to hold the interest of his customers, has a very valuable asset. But above all, he must know his product and must have confidence in what he is selling. Therefore, *do not send your salesmen out "half-cocked," or unprepared to properly represent you.*

The principal factor in increasing your dealer's organization is the thorough, systematic and frequent following up of dealer prospects, and in securing representation generally all over the territory.

Territories Must Be Developed

We allot you this territory with the distinct understanding that it will be developed, but I know, and you know, that in nine cases out of ten an increased volume of business can be obtained, which will make your business very much more profitable. *Even when we have no cars to deliver, it is policy to keep men out among your dealers, assisting them with their retail prospects and securing orders for future delivery.*

In July and August last, the clothing and suit salesmen were out with winter goods, and they are out now with spring and summer raiment. The hardware jobber secures his large volume of business through frequent calls upon his trade. Are these lines any more standard than the automobile trade to-day? Do you realize that there are nearly 30,000 automobile dealers in this country and 25,000 garages in addition, most of whom sell a few cars during the year? Isn't this business worth cultivating every month in the year?

The work of your salesmen should be supplemented by the proper amount of advertising in your territory, and this corporation has always co-operated very liberally.

A follow-up system, both for dealer and retail prospects, should be installed and made use of. If you haven't such a system, *we will very gladly assist you in preparing form letters for that purpose with a very definite aim in view.*

Don't let the increase in postage rates of one cent on each letter prevent you from keeping in constant communication with your prospects.

The great majority of people are earning more money than they ever did before, and they are spending this money freely; particularly is this so in the agricultural sections.

In Illinois, for example, the value of farm crops for 1917 is estimated at seven hundred and six million dollars as against four hundred and thirty-nine million dollars in 1916.

The total increase in the farm value of crops as compared to last year is \$2,375,000,000, the total value this year being about nine and one-half billion dollars.

In only two States, Maine and Montana, is there any decrease over last year, and that is only nominal.

Isn't the farmer—be he raiser of cotton, corn, wheat, potatoes or live stock—going to spend some of this tremendous income for automobiles?

Then, again, millions upon millions of dollars are being spent by the Government in the manufacturing centers all over the country for munitions, ships, army equipment and numberless other items. This money is not being hoarded, but is being put back into trade, and you are going to get your share of it if you only make the necessary effort.

For a few months it may require a little more effort, possibly a little more concentration in territories where business is a little slow at this time, but I do not believe that we need have any fear for the future.

Automobile a Business Necessity

Business is going on as usual. *An automobile is an absolutely necessary article in the business world to-day, and is therefore going to be bought.*

There is one matter over which you have no control, but which is growing more and more serious and will continue to do so, and that is the freight car situation.

The Government is requiring and commandeering more and more equipment every day. Automobile cars are being used for shipment of all kinds of merchandise and the shortage will unquestionably continue.

I know of one distributor handling the Buick car who two weeks ago drove fifty-one cars away from Flint because he could not get railroad equipment for shipment to the South.

Another distributor drove eleven Cadillacs away from Detroit for the same reason.

It will, therefore, be necessary for you to anticipate your orders and to *stock cars this winter*, provided we are in position to ship you, and by spring it would not surprise me if we would have to ask you to *drive a very large proportion of cars away from the plant.*

We have written you and pleaded with you to unload cars promptly, and there are very few of our distributors who are not co-operating with the Government and with ourselves in the prompt unloading of cars, thus making railroad equipment immediately available.

This is going to help us to secure cars.

If the reports to the railroad commission show that equipment used by ourselves is being immediately unloaded upon arrival at destination, we are going to be in much better position to secure equipment than if these cars were tied up for days at a time.

Some of the officials at Washington have even taken the position that automobiles are built to move under their own power; that freight cars are needed for the prosecution of the war, and, therefore, should not be used for transportation of automobiles. Just how far the Government will go along this line no one knows, but the situation is *more serious than you realize.*

We cannot solve all of your problems, but I want you men to feel that if you have any troubles, if you are not getting along as fast as you would like, *don't sit down and wait for something to turn up, or don't wait until we have to write you and ask what is the trouble.*

You are going to know of the slackening up of sales before we are, and I wish it were possible for you to realize that we really want to help you.

You are not only free to bring these problems to us, but we invite you to do so, and we will try to have a man on the ground to help straighten out any knotty problems.

Machining Versus Metal

Weight of Automotive Products Largely Controlled by Cost of Machine Shop Operations—Really Light Car and Truck and Cheap Airplane Problems to Be Solved by New Methods of Manufacture

By A. Ludlow Clayden

THE weight of all automotive machines, not even excepting the airplane, is very great by comparison with the load carried, and the weight which the machine itself possesses is dead weight that costs money to move and does no good. The only vehicle in which a rock bottom of lightness has apparently been reached is the pedal bicycle, which weighs about a sixth of its load, and by scientific design and costly workmanship it can be made 33 per cent lighter than the average.

The motorcycle weighs about 300 pounds and carries perhaps half its weight. The Ford car weighs nearly a ton and carries about a quarter of its own weight. A seven-passenger Marmon weighs 3500 and carries less than a third of its weight. A five-ton truck weighs about the same as its load. From all these machines much could be cut if it did not cost so much to cut it. Even the Marmon, which is admittedly the lightest large car in the world, could be trimmed hundreds of pounds if drilling, filing and scraping were carried all over it, cutting off an ounce here and another there. Even in the Franklin there is some waste metal because of the prohibitive cost of removing it.

Neglecting cars in which weight reduction has been made a study, like the Marmon and Franklin, and turning to the conventional kind, the opportunities for weight cutting are increased enormously. The usual pressed steel frame can be cut out and drilled all over without weakening it, and still more weight saved by making it of a deeper lattice pattern, like the original Fergus frame. Cross members can be punched full of holes; spring hangers of steel forgings, machined all over, would weigh scarcely half as much as cast-steel parts. In an engine many pounds can be drilled out of a crankshaft without affecting its strength. Cylinders of thin steel, built up with the lathe and the welding outfit, may weigh less than a third as much as cast iron. Water pipes and manifolds could be pressed or drawn from aluminum of a quarter the weight of castings which do the work no better. Connecting-rods of alloy steel machined all over would remove another five pounds or so, while most of the bolts used could be hollow.

Ten Years Hence

It may seem visionary to believe that the road vehicles of ten years hence will be much more like the airplane engines of to-day than like any other mechanism we know, but there is no reason why this should not come to pass. Press work is in only an early stage of development. High-speed machine tools are daily being rendered obsolete by still higher speed machines. The ability of automatic tools increases rapidly. Nor is it in machining only that changes are seen. Forging by dies is advancing as an art at a great pace, foundry practice is being modernized the world over, while the making of large parts from drawn steel is a new art that is scarcely born.

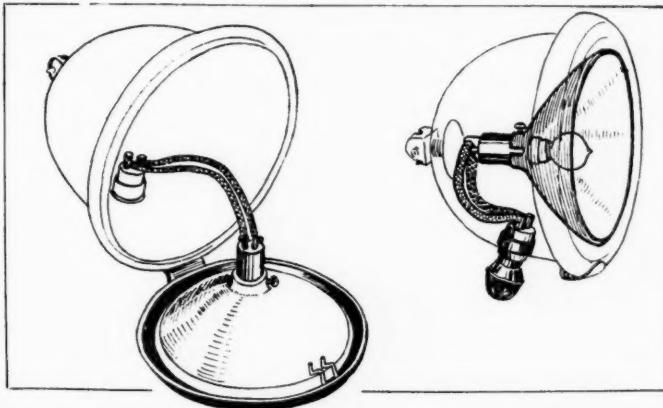
Looking back a short time and comparing then existing engineering with a cheap automobile of 1917, the latter would appear to be a marvel of lightness. Year by year we have found how to economize on metal, and we have so saved it because the more elaborate machining called for cost less than the metal saved.

Yet to the majority of automotive engineers the idea of working in close communion with machine tool, foundry, forging and other experts is strange. The production men and the engineers work with a river between them and seldom take the trouble to row across to the other side.

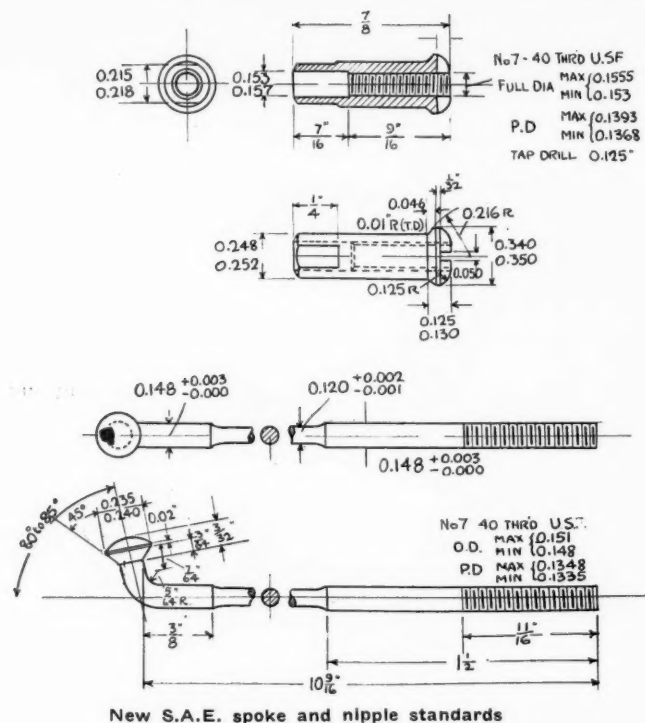
Speed Up Co-operation

There is an opportunity for the S. A. E. to arrange some meetings for the discussion of new processes and new tools. It would encourage many an engineer to try out and help along some better way of doing things. The engineer always desires to economize material, the production expert to economize labor and cost. Development is only possible by experiment and experience. Is it not probable that the quantity manufacture of steel cylinders for the Liberty motor, for example, will show up new ways of making them vastly cheaper than any previous methods? Is it not possible that some way can be found to forge hollow crankshafts? Good ideas are so apt to languish for lack of interest, or lack of appreciation of the possibilities they hold. Such, for instance, is the process of hot rolling gears which makes almost a finished gear with no loss of metal whatever.

This instance happens to be one which has reached the writer's notice, but there must be many others. The point is that the engineer and manufacturer is too prone to wait till a new process is brought to him, and then to disbelieve it till some competitor has tried it out and proved its value.



A new side lamp introduced by the Corcoran Victor Co. has the reflector fitted on a hinge so that by opening the front the light may be directed downward. It is intended to be used for illuminating the side of the engine for oil filling or adjustment purposes while acting as an ordinary side lamp when closed



Water Injection May Increase Power

With Kerosene Fuel and at Certain Speeds Water Injection Permits
More Spark Advance, Hence Gives More Power

By J. Edward Schipper

WITH the increase in the use of heavy fuels, particularly in tractor work, the question of water injection continually forges its way to the front. In spite of almost endless series of experiments which have been made in the past, with the result that engineers have secured a great many varying results, the idea that the injection of water is a direct aid has never been discarded. Recent developments in connection with the use of the heavier fuels in truck and tractor engines show that without doubt there is a field for water injection and air washers or moisturizers, which renders it of considerable importance.

From tests which have been carried on it seems to be beyond doubt that the water spray lessens rather than increases the power with a given spark position. On the other hand, however, the spark can be carried much higher with water injection than without it, with the result that horsepower curves taken under the best conditions for both kerosene alone and kerosene with water injection show that there is an advantage in favor of the water injection.

The curves illustrated in Fig. 1 show the results which have been obtained by comparative tests made on a four-cylinder, 4 x 5½-in. truck engine, with a Holley carburetor. In taking these curves it was found the most advantageous ratio of water to kerosene was about 0.75 lb. of water to 1 lb. of fuel. At wide-open throttle the proportion of water could be carried up to the point where it was fed in equal parts with the fuel, and at low throttle the water is materially decreased. The water was injected at the venturi in the form of cold spray, with care being taken to atomize the water so as not to short the plug points.

A study of the curves will show that the results over 1400 r.p.m. are not noticeable. The maximum effects of the water take place between 1000 and 1200 r.p.m., and at 1000 r.p.m. there is a gain in horsepower of 5 per cent. This gain is particularly due to the ability to carry the spark higher, resulting in a higher mean effective pressure.

Neglecting for the moment the mechanical efficiency of the engine, the indicated mean effective pressure is 137 lb. per sq. in. in the engine without water injection and 145 lb. per sq. in. in the engine with water injection, the horsepowers being respectively 24 and 25.3.

Effect on Indicator Card

No indicator card has been taken of which AUTOMOTIVE INDUSTRIES has any record with and without water injection, but in all probabilities the card would show the effects of retarded combustion with the water injection. The expansion curve would be fatter but the ignition point would be lower, giving a card more in the nature of a steam card with a higher expansion line. This effect of retarding combustion, which is probably the most logical explanation of the action of the water, has the effect of softening the results given by carbon deposit. The

pre-ignition knock can often be removed by injecting the water.

What really happens when the water enters the cylinder is at present a matter of conjecture and theory rather than fact. There are two or three theories which have been advanced by those working with the water. One which is mentioned quite often is the fact that the water has the effect of quenching the incandescent points of carbon. Another theory which has often been mentioned is that the water, when injected, carries off a considerable amount of heat due to latent heat required for vaporization. This theory is somewhat uncertain, however, as a great many claim that practically the same results are obtained with steam injection as with water, and if this is so the latent-heat theory will not hold. The theoretical end of the matter, however, is not so important as the actual fact that the tendency toward knocking is reduced by the introduction of the liquid spray. It would be instructive for Orsadt tests to be made showing the exhaust gas analysis with and without water. The relative percentages of H₂O and CO₂ might tell something of what actually occurs. It has often been thought that when heavier fuels are cracked, free hydrogen is released which gives an explosive rather than a burning charge, and consequently produces the knock.

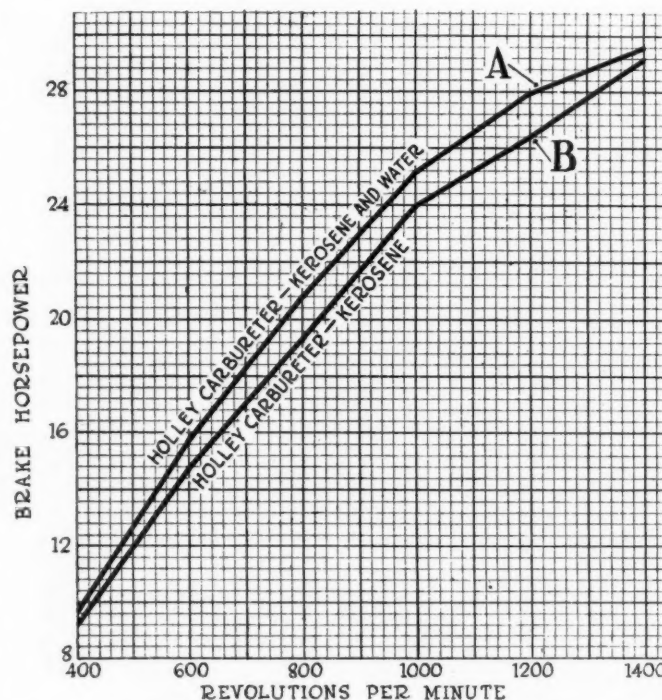


Fig. 1—Results of tests with and without water injection made with the Holley kerosene carburetor on a 4 by 5½ truck engine. The curves show the best horsepower that could be obtained with each condition, the spark being further advanced in the case of the water-injected mixture.

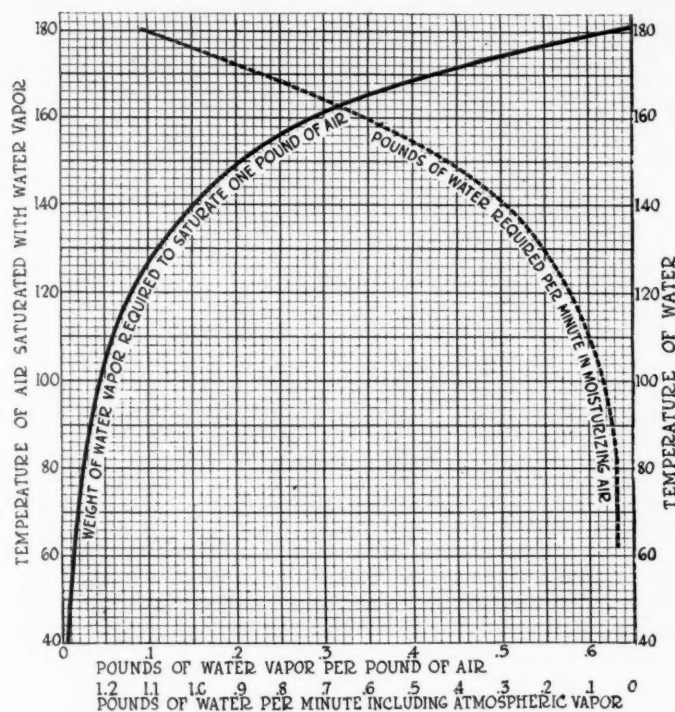


Fig. 2—Curve showing weight of water required to saturate one pound of air at different temperatures, from Lucke's Engineering Thermodynamics, and a derived curve showing how much water would be used by a 4 by 5½, four-cylinder truck engine running at 1000 r.p.m., operating at 100 per cent volumetric efficiency and at 80 per cent saturation

The question of air washers is very intimately wrapped up with the water-injection problem. The air washer, in fact, has a dual purpose, first in moistening the air, and second in removing the dust. The first operation is commonly conceded to be an important factor in the successful use of kerosene, while the second is purely a mechanical proposition and is, of course, recognized as a necessity for tractors which operate in dust clouds.

One of the greatest fallacies which is quite commonly believed in regard to the moistening function of the air washer is that it would be advantageous to use warm water. Those recommending this practice do not realize the tremendous amount of water which is consumed by one of these warm-water devices. The accompanying curve shows the weight of water vapor required to saturate 1 lb. of air at different temperatures. At 180 deg. the amount of water required is approximately .6 of 1 lb. for each pound of air. At a temperature of 175 deg. it requires half as much water as air by weight to saturate the air. In actual practice the water absorbed by the air is about 80 per cent of the saturated point, but nevertheless even at that rate the consumption of water is considerable.

Assuming a four-cylinder 4 x 5½-in. engine of 276.5 cu. in. piston displacement running at 1000 r.p.m., the engine breathes in 40 cu. ft. of air in a minute. At 172 deg. the weight of a cubic foot of air is .0628 lb., and the engine, if taking the air in at this temperature, would breathe in 2.5 lb. of air per minute. If the air were saturated with water, the amount of water required would be .5 lb. per pound of air. Taking 80 per cent of saturation, the amount of water required is .4 lb. per pound of air. Since 40 cu. ft. of air at 172 deg. weigh 2.5 lb., the amount of water required per minute would be 1 lb.

The air drawn in contains a certain amount of moisture so that the total taken from the moistening system would be the difference between 1 lb. per minute and the weight normally contained in 2.5 lb. of air under given at-

TABULATION SHOWING COMPUTATION OF POUNDS OF WATER REQUIRED PER MINUTE IN MOISTENING AIR

Tw	C	Wa	P	S	S 80	R
62	40	.076	.015	.045	.036	.036
82	40	.073	.03	.088	.074	.036
122	40	.068	.09	.245	.196	.146
142	40	.066	.17	.447	.357	.307
162	40	.064	.35	.90	.720	.670
172	40	.063	.5	1.25	1.000	.95
180	40	.062	.6	1.47	1.176	1.12

Tw Temperature of water.

C Cu. ft. air breathed by engine per minute.

Wa Weight of cu. ft. of air.

P Pounds of water vapor per lb. of air.

S Pounds of water vapor per minute, saturated.

S 80 Pounds of water per minute, at 80 per cent saturation.

R Pounds of water per minute, including atmospheric vapor.

R = C x Wa x P x .80 — Water in atmosphere.

mospheric conditions. This is about .02 lb. per pound of air, or .05 lb. per min., leaving .95 lb. per min. to come from other sources. Assuming a volumetric efficiency of 80 per cent, this would mean .76 lb., or .09 gal. of water per min. used.

As can readily be seen, this is a tremendous consumption of water and renders impractical the schemes which have been suggested to use the water from the radiator or some other heat source to supply the air washer. The amount of water picked up at 80 deg. Fahr. is less than .03 lb. per pound of air and is a much more logical proposition.

Referring to Fig. 2, the curve of water vapor required to saturate one pound of air, as given by Lucke in his "Engineering Thermodynamics" is shown, together with a very interesting derived curve showing the amount of water that would be required at different water temperatures, of the engine referred to in the curves given in Fig. 1, and to which the figures above also refer, neglecting volumetric efficiency. The reason for the necessity for constantly replenishing the supply of water is clearly brought out by this curve.

Two Types of Fruehauf Trailer

THE Fruehauf Trailer Co. of Detroit, Mich., manufactures two types of trailers—the first a standard two-wheel trailer type having the front end mounted on the rear of the truck body, and the other a light two-wheel semi-trailer for passenger car use.

Three models are manufactured of the standard trailer type, the 4-ton, the 6-ton and the 10-ton. The construction throughout is exceptionally sturdy, the frames being heavy steel channel, held together by four cross members, gusseted and hot riveted. The springs are of semi-elliptic design of high carbon steel, those on the 4-ton model being 4 ft. long, 3 in. wide and having 14 leaves. All models are mounted on either Firestone or Goodrich tires; the wheels are of heavy artillery type and are carried on Timken roller bearings. The weight of the 4-ton model is 2200 lb., the 6-ton 3100 lb. and the 10-ton 3700 lb.

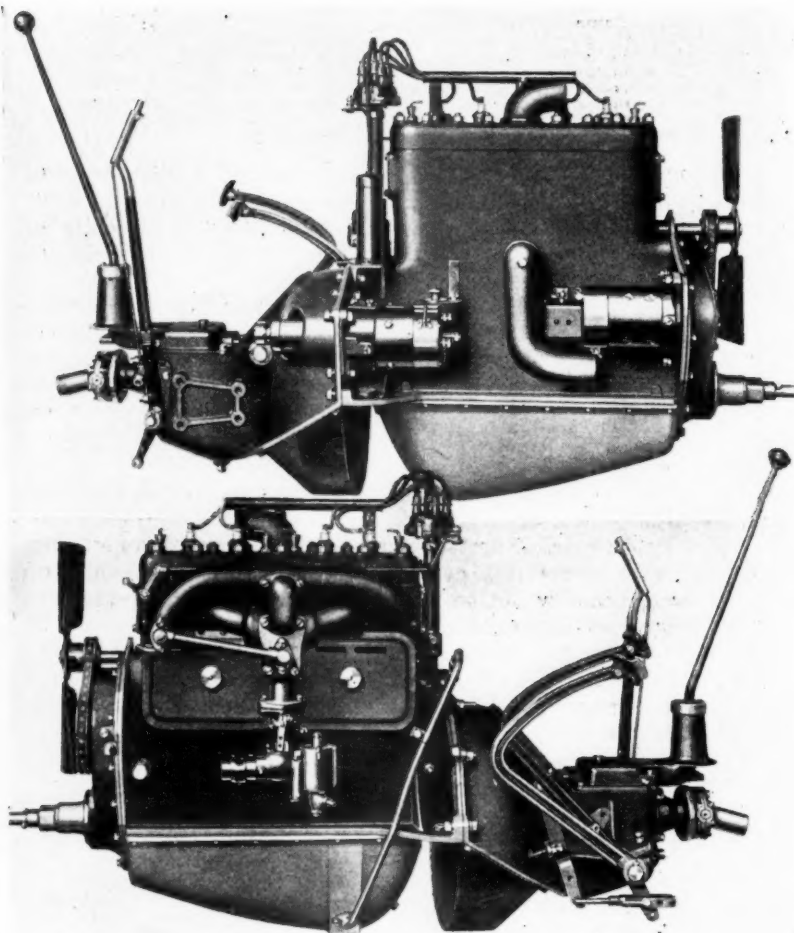
Several models of the semi-trailer are manufactured, and the price of the 1-ton model is \$135. The body is white oak 8 ft. long and 3 ft. 8 in. wide; the wheels are of the artillery type, 32 by 2, and carried on Timken roller bearings.

A trailer support or rest is provided when it is decided to use the truck in conjunction with two or more trailers. By the use of two trailers, each provided with this support, one trailer may be hauled while the other is being loaded, and thus the truck kept in service practically all of the time.

This support comprises simply two angle iron rests swivelled to the under part of the trailer frame and swung up out of the way when the trailer is attached to the tractor. When it is desired to disconnect the two, the front end of the trailer is raised from its connection with a Martin rocking fifth wheel on the back of the tractor by means of two jacks that are part of the equipment. Two angle iron supports are then dropped, the jacks lowered and the trailer allowed to rest on the supports, leaving the tractor free to depart. The attachment is a reverse operation.

At present a new type of trailer support is being designed whereby the jacks are incorporated in the legs of the supports.

Hupmobile Now Smaller



Left and right sides of Hupmobile power plant, showing carburetor and manifolds, detachable head and mounting of starter and generator

THE Hupmobile, originally a small car with great economy of operation as one of its chief features, gradually grew bigger for several years. Believing that the day of the high-efficiency, economical small four is returning, the Hupp company has now reduced the size of their car considerably, at the same time redesigning it throughout to increase the power and decrease the weight. The new chassis is one that ranks high as an engineering accomplishment. It should fill the needs of a much-neglected buyer, the man who wants a well-made car which will be durable, and yet desires a machine with a minimum up-keep.

Although smaller than the 1917 Hupmobile, the new car has as much body room, save that the seven-passenger model is discontinued. It is possessed of the same performance abilities, is made of equally good material and with the same standard of workmanship, and is slightly cheaper, the price being \$1,250 for the five-passenger and \$1,250 for

Lighter and Higher Efficiency Chassis Replaces Old Model—Extremely Compact Design Is Entirely New

the roadster, these being the only two models as yet listed. Both are 112 in. wheelbase.

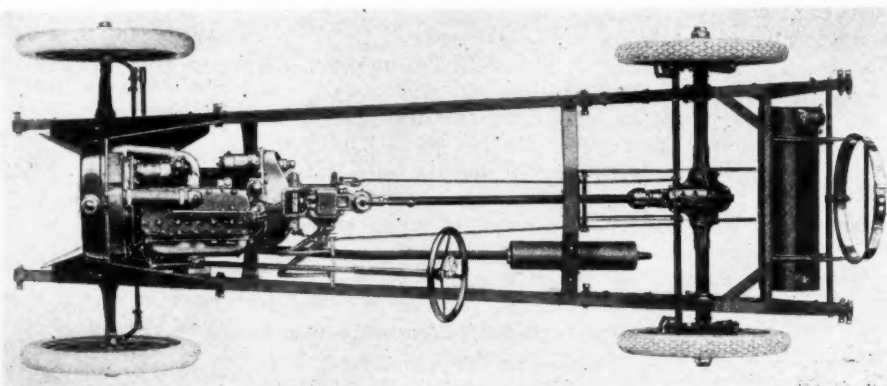
Very Compact Powerplant

The engine is an entirely original design, and remarkably small for its cylinder dimensions, which are $3\frac{1}{4}$ by $5\frac{1}{2}$ in., 182.5 cu. in. piston displacement. It has a detachable head, which is new to Hupmobile practice, and the crankcase is integral with the cylinders. The casting also includes the top half of a bell housing which carries the transmission. The oil pan is an aluminum casting, and the clutch is inclosed underneath by a pressed-steel member, which completes the bell housing effect.

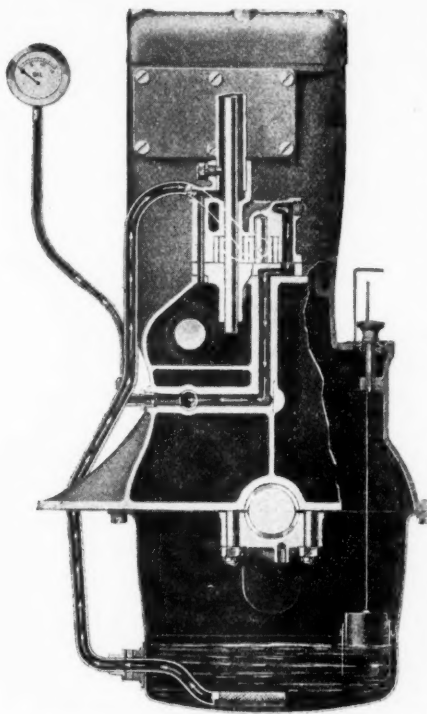
The unit cylinder and crankcase casting are unusually smooth externally, and all the accessories are very accessible. Both manifolds and the Stromberg carburetor are on the left side, the right being devoted to generator and starting motor, a good point being that the latter is above the crankshaft line, and so as accessible as the generator.

The front end has a silent-type chain drive with triangular layout, adjustment being made by rocking the generator on its flange mounting. The front end of the crankcase is machined flat, without any compartment for the chain, the whole inclosure being performed by a deep steel pressing. The camshaft is carried through the cover, and on it the fan pulley is mounted, this raising the V belt away from the dirt usually present at a lower level.

One of the most ingenious features of the engine is the oil pump and distributor drive. Right above the flywheel bearing, on top of the crankcase, there is a faced surface through which there are two holes. The larger gives access to the camshaft, which has a skew gear on



Plan view of the Series R Hupmobile chassis, showing the layout of the driving members and brake linkage and simplified tapered frame



Cutaway view of engine, showing course of oil in the new pressure feed lubricating system

that the suction lead is carried to the top of the pump casing, it is impossible for the pump to drain, and it therefore never needs priming. The placing of the distributor allows a minimum of high-tension wiring to be used; the coil also is set right beside the oil pump. The timer is an Atwater Kent closed-circuit type.

Oiling Under Pressure

The oil pump has a fairly large capacity, and feeds direct to the three main crankshaft bearings through channels in the iron crankcase, which are drilled out. The illustration on this page shows how these leads interconnect and how the pressure gage is attached. The crankshaft is drilled to transfer oil to the pins, and the camshaft chain obtains its supply from the release valve, which is adjustable from outside. The suction pipe is external, which gives the oil a chance to cool. There are two strainers, a coarse screen covering the whole area of the oil pan and a smaller screen on the end of the suction pipe, this being fairly easy to take out for cleaning. A float indicates the oil level alongside the filler cap, which is on the right side, close to the starting motor.

Hourglass Pistons

Cast iron is used for the pistons, which are of hourglass form, with the peculiarity of possessing only two rings, one at the top and one on the skirt, the latter being for scraping only. The castings are ribbed for strength and heat conduction, but the weight is low. The hollow wrist pins of .15 to .25 carbon steel take their bearing in the pistons direct, being pinned in the rods.

its rear end, and the smaller is the oil-delivery channel. The oil-pump casing sets on the crankcase here, the gears being in a horizontal plane. The drive is, of course, taken from the camshaft, and the spindle of the pump pinion is continued upward through the pump case, terminating in the timer distributor, which stands well above the rear end on the cylinder block. The driveshaft is inclosed in a tube, so there can be no oil leakage, and no tight packing gland is needed on the pump. Owing to the horizontal position of the pump, and to the fact

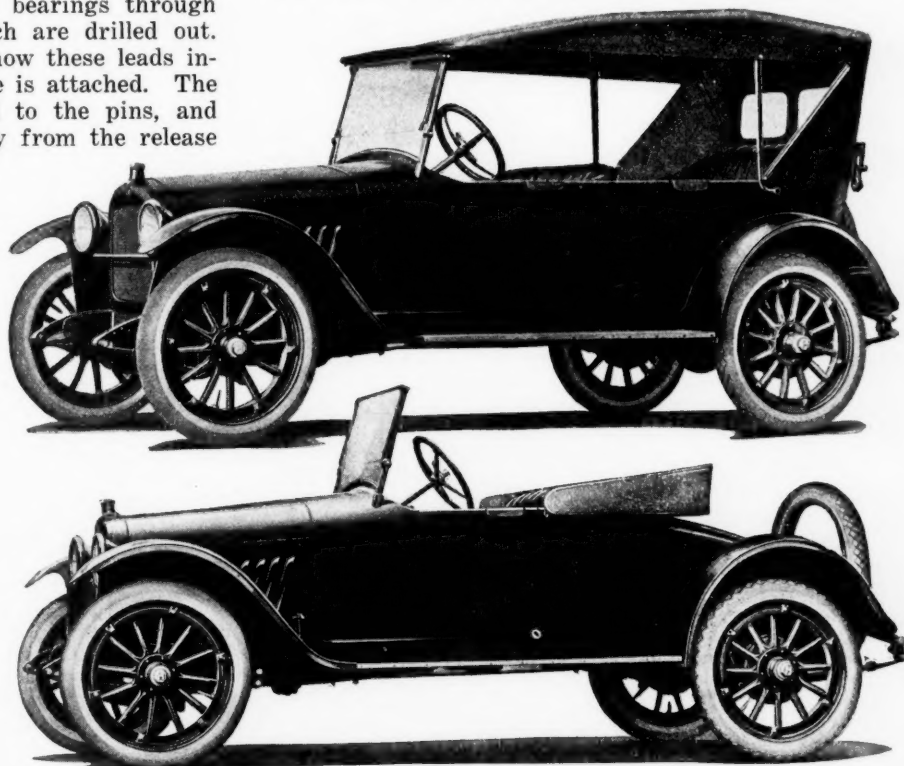
The connecting-rods are I-beam drop forgings from .35 to .45 carbon steel. They are machined for lightness and balance and the caps are fastened by two 7/16-in. bolts of 3½ per cent nickel steel. The bearings are phosphor bronze, babbitt lined. The crankshaft is a .40-.50 carbon steel drop forging carried on three phosphor bronze bearings, having a high-speed babbitt lining. The bearing sizes are: Front, 1⅞ in. long by 1 13/16 in. diameter; center, 1⅞ in. long by 1 25/32 in. diameter; rear, 2⅞ in. by 1¾ in. diameter. These bearings are split and provided with shims for adjustment. The crankshaft is balanced in conjunction with the flywheel after the two have been assembled together by means of a six-bolt flange connection.

The camshaft is a drop forging of .15-.25 carbon steel, hardened and heat treated and carried on three bearings. The valve followers are mushroom type, the tappets being hollow. The valves are forged in one piece from alloy steel. They have a diameter of 1⅞ in. clear and a 45-deg. seat. The tappets are assembled, with the guides, as two units and can be readily removed by taking off the valve cover plate, which is held in place by knurled screws, and taking out the cap screws which hold the tappet assembly in place. The valve covers inclosing the valve action act as breathers, so that oil vapor surrounds the valve action, keeping these parts constantly lubricated.

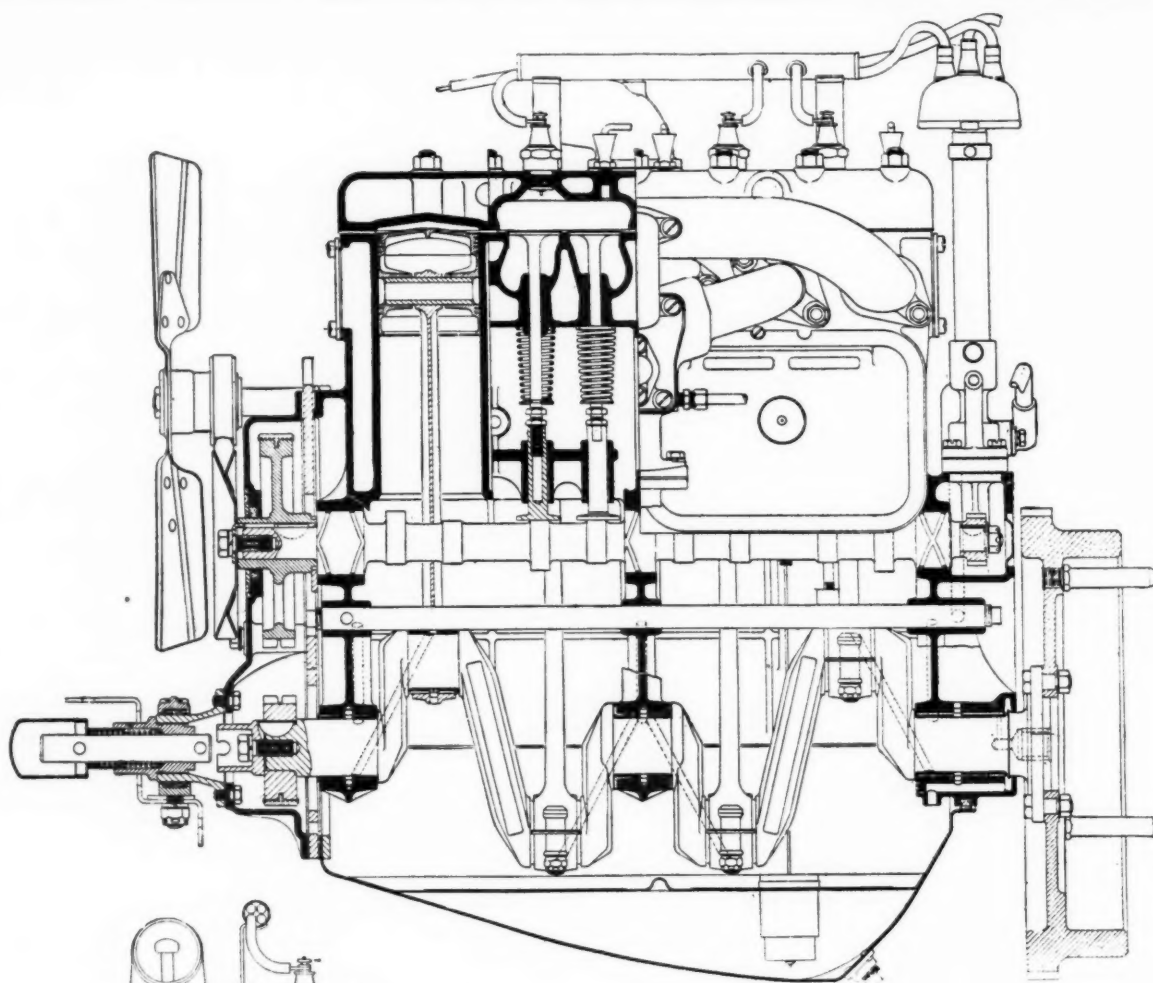
Elaborate Carbureter Heating

Quite one of the leading features of the engine is the fuel-heating arrangement. The mixture is handled by an exhaust jacket, hot section on the manifold in direct connection with the exhaust manifold above. The exhaust discharged from the two middle cylinders goes direct into the jacket, and the discharge therefrom is through a small pipe leading to the exhaust manifold just above the muffler pipe flange. In addition there is a stove on the exhaust pipe connected to the primary air supply, and this has a cold-air door controlled from the cowl board.

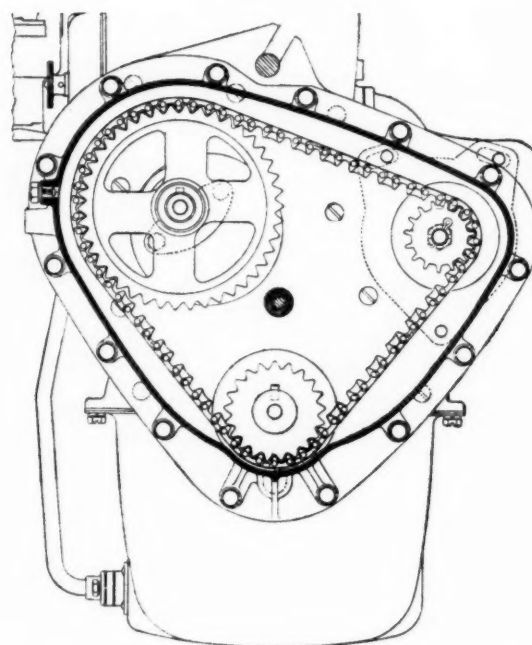
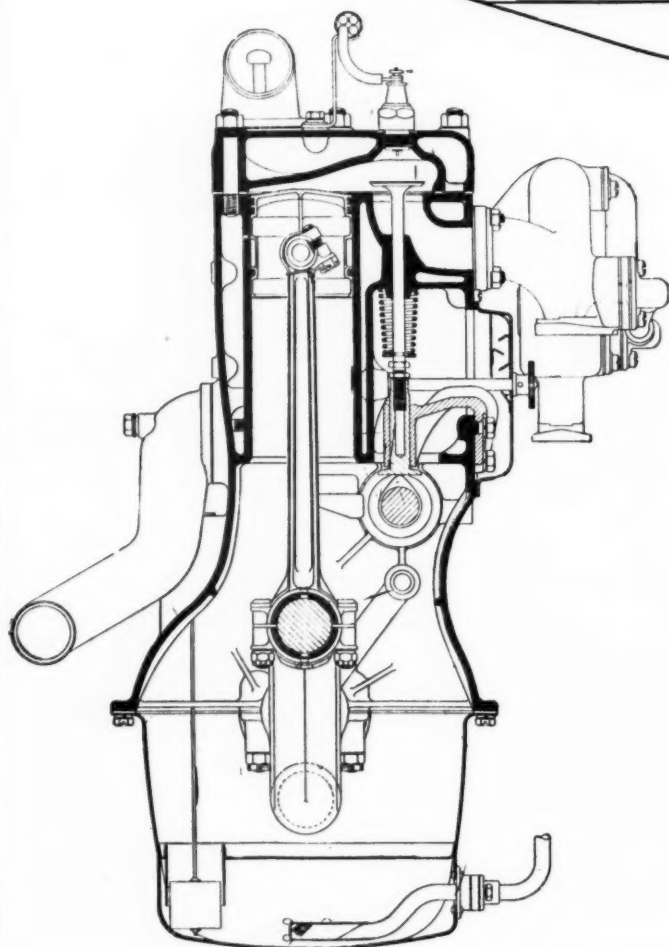
Fuel feed is by Stewart vacuum tank, another innova-



Side view of the Series R Hupmobile touring car and Series R roadster, which has a seating capacity of three



Engine Details of
Series R Hupmobile
3¼ x 5½ In.



tion for the Hupmobile. The rear tank contains 13 gal. normal supply plus a 2-gal. reserve.

Exhaust is discharged from the manifold at the front end instead of the rear, which enables the pipe to be kept well away from the body throughout its run. Entrance of hot air into the driving compartment is further guarded against by fitting each of the pedal levers with a rubber disk beneath the floor boards. This closes the hole in the board when the pedal is in the normal position. It should also be noticed, in the plan view of the chassis, that there is no regular pan beneath the engine. For a short distance back of the radiator are two flaring mud screens which protect the front end from dirt but leave the under side of the crankcase free to the air. This, of course, also helps to keep the oil cool in the pan.

The whole powerplant is flexibly supported in the frame with a packed ring attachment in front, shown in the sectional drawing on page 872, and a rigid pair of seats on a cross member at the rear.

Has Syphon Cooling

Cooling is by thermo-syphon, the radiator capacity being increased in proportion on the new engine. The radiator and motor combined have a water capacity of 5½ gal. and the fan is a two-blade airplane type running on ball bearings. There is a sliding tension adjustment to prevent slippage of the fan belt.

For lighting and starting, the two-unit Bijur system is employed, operating at 6 volts and wired on the grounded return system. The automatic cutout relay switch is in a sealed box on the end of the generator. The Bijur starting motor is mounted in the clutch housing and engages the flywheel by means of an automatic screw shift which is electrically operated. With this mechanism the starter is thrown out of mesh even though the pedal be held in place after the engine has started.

There are two fifteen-candle power headlamps, a tail lamp and instrument lamp. The latter has an individual switch so that it may be turned on and off independently. The fuse box is also located on the instrument board and there is space for a spare fuse, which is furnished with the car. The battery is a Willard 90 amp. hr. A com-

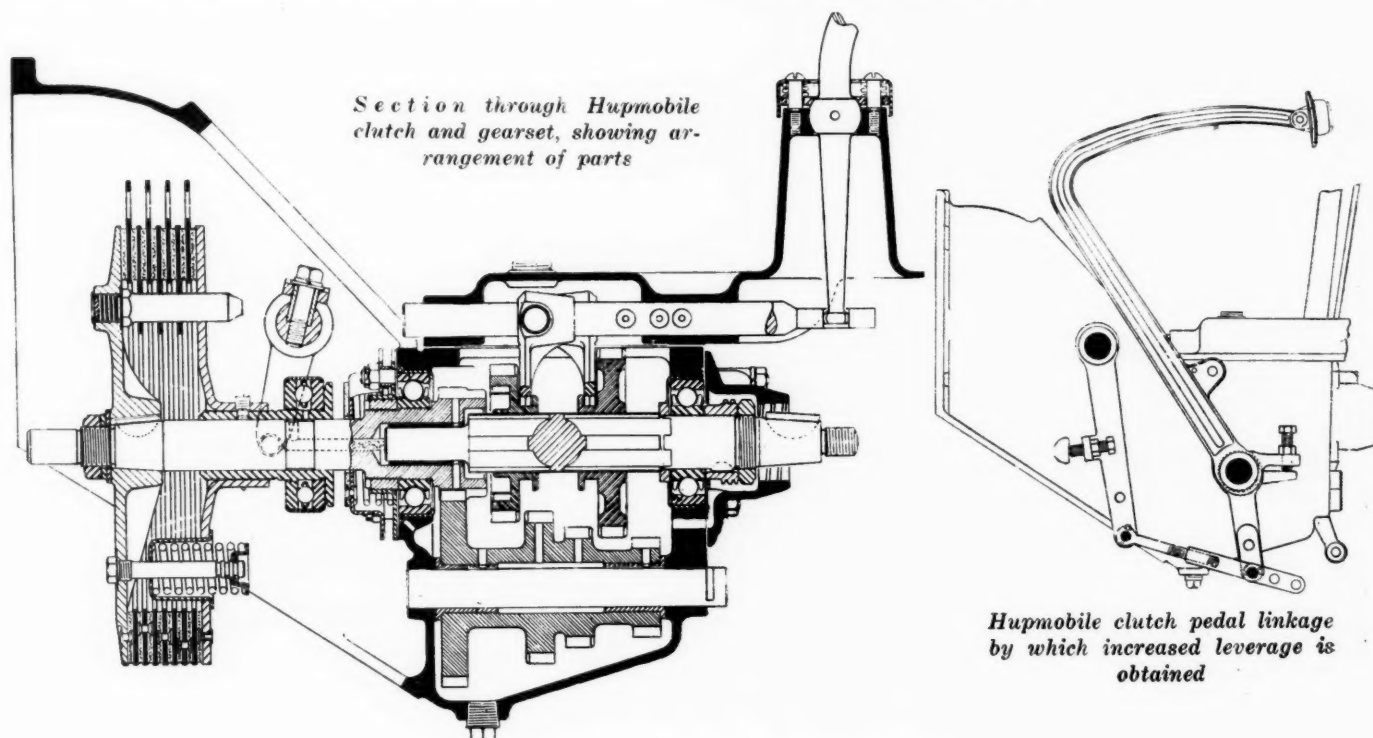
bined cowl board switch cares for ignition and lighting, this being furnished with a lock.

The clutch is a dry disk type having seven steel plates each 9.34 in. diameter, faced with asbestos fabric and operated by six springs. The clutch pedal is so arranged as to give a very light action, and it is adjustable for length of movement, position and pressure. The details of the adjustments and the multiplying levers are shown on page 873. The clutch shaft runs on annular ball bearings.

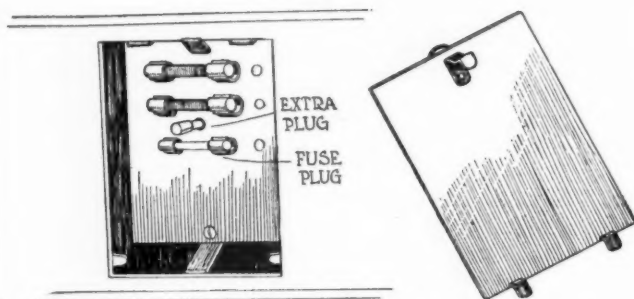
There are three speeds forward, in the transmission, and 3½ per cent nickel steel is used for both gears and shafts. Ball bearings are fitted to the spline shaft and plain bearings on the countershaft. The transmission has been so lowered as to put the top on a level with the floor boards, giving more foot room and clearing out the front compartment.

Another unusual feature is the length of the shift lever, which is a cane type, 24 in. long, bringing the handle in close proximity to the driver's hand. The emergency brake lever, which is carried on the side of the gearbox, provides an unusually powerful leverage, while unusual care is observed in operating the latch to disengage the brake. From the gearbox the drive is taken through two universals and a tubular propeller shaft, 1⅝ in. in diameter.

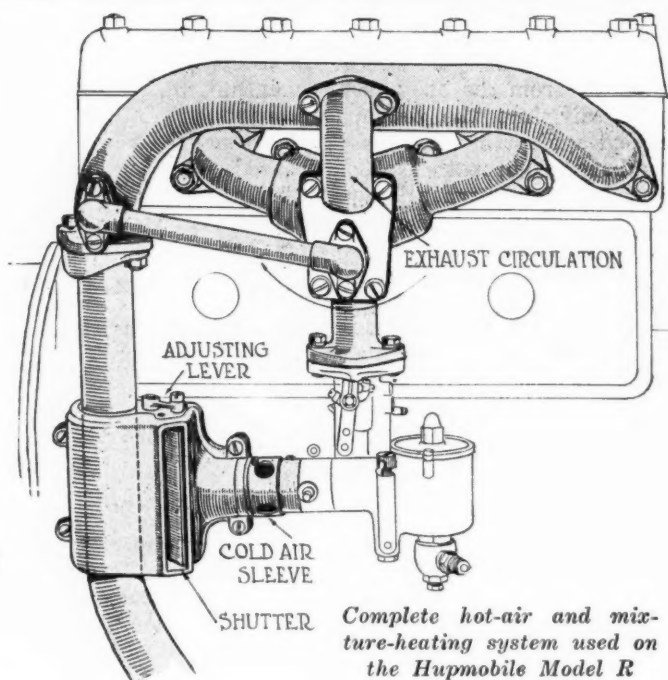
The rear axle is three-quarter floating with chrome nickel steel shafts, 1¼ in. in diameter. The wheels are attached to the shafts with taper fits and keys, and the driving gears are spiral bevel with a ratio between ring gear and pinion of 4.91 to 1. The pinion bearings are taper rollers and the gear and shaft bearings are Hyatt. Thrust is taken by ball thrust bearings. Conventional design is used for the brakes, there being two sets on the rear wheels. The external brakes are used for service and they are 12 in. diameter by 2 in. wide; the hand brake is 11 11/16 in. diameter by 1¼ in. wide. All brake linking rattles are guarded against by spring tension. Underslung rear springs are used, both front and rear springs being semi-elliptic. The fronts are 36 in. long and the rears 51 in. On the rear spring the main leaves are of chrome vanadium steel.



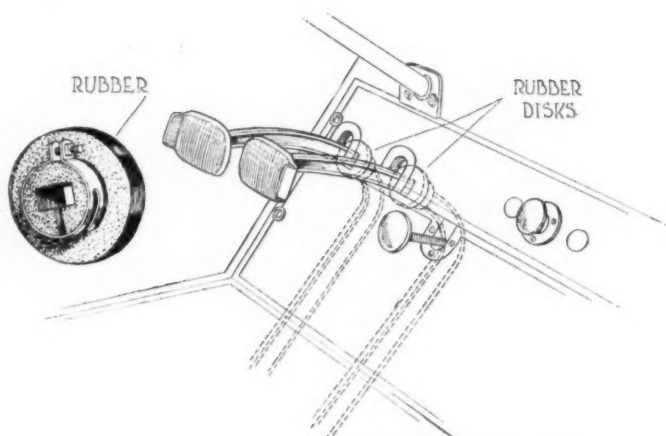
Construction Details of New Series R Hupmobile



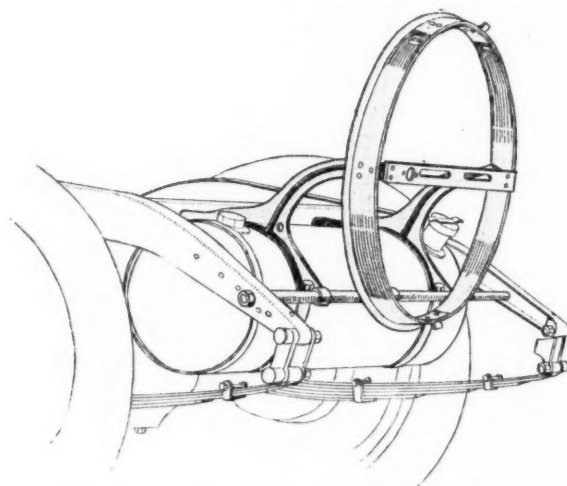
Hupmobile fuse box mounted on the dash, showing extra fuse



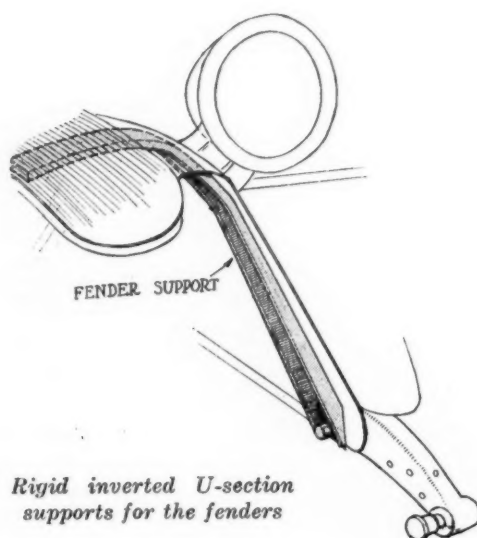
Complete hot-air and mixture-heating system used on the Hupmobile Model R



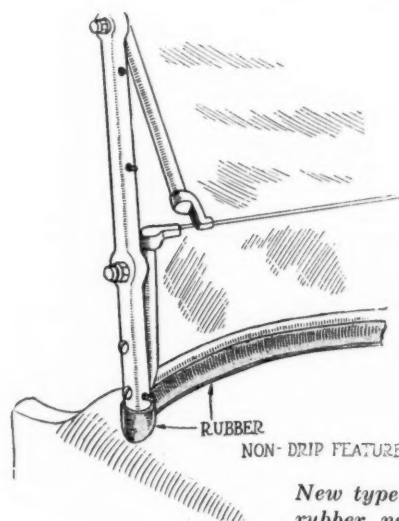
Hupmobile pedals provided with rubber plug to seal holes in footboards



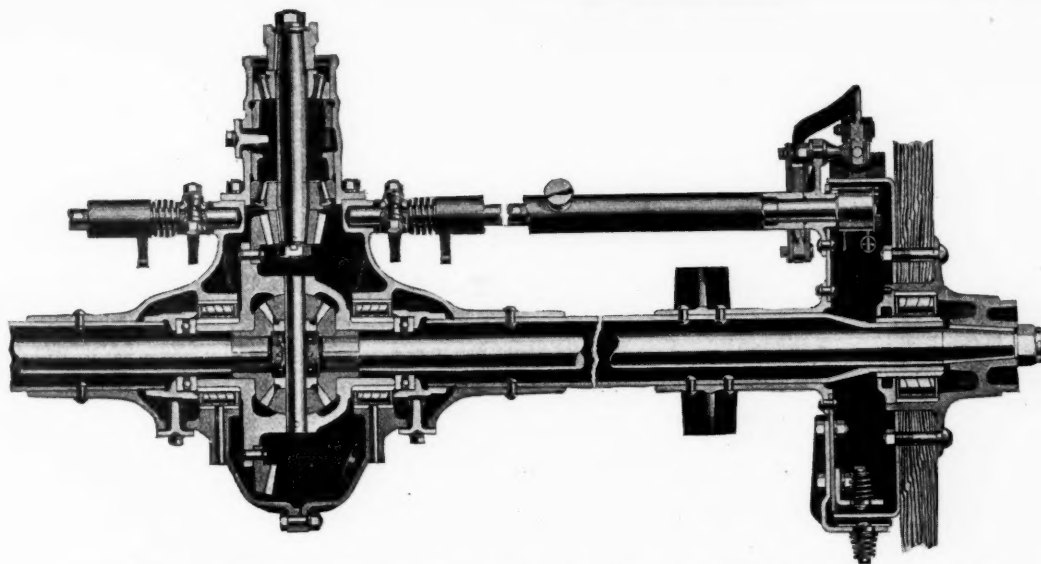
Rigid spare tire carrier and cross member on new Hupmobile Series R



Rigid inverted U-section supports for the fenders



New type of windshield with rubber non-dripping feature on new Hupmobile



Sectional view through the rear axle of the Hupp motor car, showing the inclosed brake actuating rod and the layout of the driving and differential gears

The steering gear is a Jacox worm-and-nut type, with a 17-in. wheel.

Two body styles are supplied with the Series R cars. They are a five-passenger touring car and a roadster. These bodies are of a composite construction, being made of sheet metal over a wood frame. The fenders are particularly noticeable in that an inverted U-section beam, bolted to the front end of the frame, supports both fender and headlamp. The five-passenger body is a conventional design, with a continuous front seat. The roadster is a single-seat type and will accommodate three people,

jack, tools, and a complete tire-repair outfit.

The car is low hung, like previous Hupmobiles, having no break in its lines from front to rear. The hood line is straight and merges directly into the side line of the car so that there is a straight line from the top of the radiator to the back of the rear seat. The windshield is sloping, and the finish on the hood, fenders and running gear is hard-baked black enamel. The body is blue, of a somewhat brighter color than that used last year. The upholstery is leather in French plaits, fastened on all edges with a leather-covered molding.

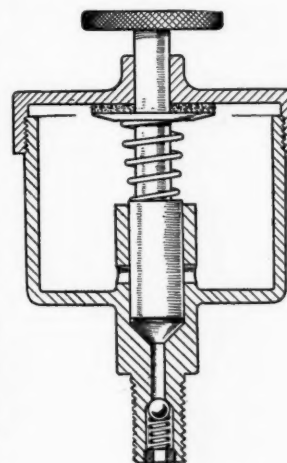
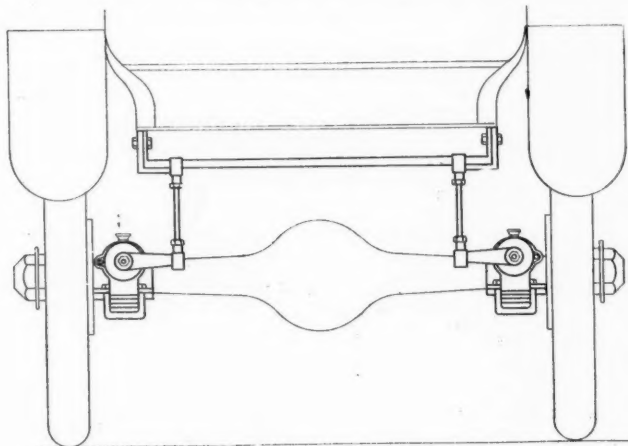
New Mounting for Houdaille Shock Absorbers

IN certain makes of cars it is impossible to fit the Houdaille hydraulic shock absorber in the usual way adjacent to the rear springs, with the absorber proper secured to the frame. For these cases a new mounting has been worked out, as shown by the cut herewith. Ordinarily the absorbers are placed on the rear side of the rear axle, but if the fuel tank is in the way they may be put on the forward side. The link of the shock absorber connects to a bracket of mild steel not less than $\frac{3}{8}$ in. thick, which should be cut out of a strip 4 in. wide and have the necessary holes drilled. It is rarely necessary to drill more than the one hole for the dowel pin, the bracket being clamped between the spring clips. Another bracket is needed for the top ball point of the link and a bar of $1\frac{1}{4}$ by $\frac{3}{8}$ in. flat iron is used to connect the brackets on opposite sides. In fitting the device great care must be ex-

ercised to see that the top ball joint comes perpendicularly above the bottom joint. The cars to which this new mounting is particularly adapted include the Hudson, Cadillac, Pierce-Arrow, Cunningham and Locomobile.

Oil Injection Lubricator

THE Madison Kipp Lubricator Co., Madison, Wis., has just perfected a highly ingenious lubricator for supplying oil to any small part of a chassis which needs intermittent lubrication. It is intended especially for spring bolts and for steering knuckles. It is also applicable at most other points where oil cups or greasers would be used. Externally it is similar to the conventional oiler, and is filled with oil by unscrewing the top. In the center is a small button, connected with a plunger backed by a spring, so that the plunger can be lifted by pulling the button and drives sharply downward on release. The plunger works in a small cylinder, which is sucked full of oil as the plunger is lifted. At the bottom is a small ball valve, and the oil is forced past this when the plunger is released. Quite a powerful jet of oil is discharged, enough to flush and reach all parts of a spring bolt for instance. The container holds 20 charges of oil, and when it is empty the fact is made obvious by the plunger going down with a snap when it is released, instead of falling softly. It seems to provide the speediest possible way of oiling up a chassis as well as being one of the most positive of all small lubricator designs.



Creeper Tractor Ancient Invention—II*

Rapid Evolution Began in 1890—Diplock Did Much to Obtain

Flexible Drive—Pedrail Experiments Led to Chain Track—

British War Office Assisted Development from 1900 Onward

IN the last issue various inventions were described starting in 1770 and leading up to 1890. This practically covered the early phase in the development of drives other than the ordinary wheel drive, but scarcely any of these inventions were ever put to a practical use. We now come to an inventor whose work has been of the greatest importance in the development of the creeper drive tractor. This is Joseph Bramah Diplock. Although Diplock's first ideas were not in the direction of creeper transmission, none the less his experiments led him stage by stage up to a creeper-type machine.

Diplock had charge of a civil engineering undertaking which lasted from 1885 to 1892 and during this he was forced to employ steam tractors under somewhat adverse conditions. In 1893 he took out a patent for a tractor, the wheels of which were all driven from the engine, all of the same size, and were all used for steering. He also allowed for oscillation of the axle due to irregularities in the ground.

This engine was built and put to use and it was reported by a prominent English civil engineer in 1899 that he believed the hauling power of the Diplock engine to be at least 50 per cent greater than that of the ordinary form of two wheel drive tractor of the same weight. He considered also that the hauling power might be increased still more when Diplock had rearranged the weight so that it was equally disposed on all of the four wheels.

Area of Contact Important

It was the experiment with this four-wheel-drive machine which led Diplock to the conclusion that the most desirable feature of the tractor was a great area of contact with the ground, rather than intense pressure on a small area. This led him ultimately to design his pedrail tractor which was used to some extent by the British army and was an eminently successful machine. This pedrail did not appear for several years, and will be described later on. Meanwhile, it is sufficient to say that it was somewhat similar to the Andrew Dunlop in-

vention, described in the last issue, only not so complicated.

The chain-track idea appeared again in a patent granted to John Walker of Ireland in 1895. This, judging by the specifications, was mainly invented for a trailer or still more probably for a horse-drawn vehicle. The weight was borne on two wheels which rested in the center of two endless chains, there being a pair of pulleys on each side of the vehicle over which the chains ran. These pulleys were set well above the level of the ground so that the load-bearing wheel would roll along the flat chain if the machine was hauled by animal or motive power.

Machine Patented in 1897

Another machine, also apparently invented mainly to be hauled rather than to drive, was patented in 1897 by Allen Justice and Peter Johnson of Arkansas. The cut illustrating their idea explains it fairly well. In the specifications mention was made of the ability to adapt this device to a traction engine, although nothing was said as to how a mechanical drive could be applied to such a layout. The chain is somewhat minutely described in the specifications, but not in such a way that its manufacture appears to be quite practical. The essential feature was that it was composed of double links so that it could bend in either direction. Hence the steering effect shown in the plan view. An interesting feature was the use of a brake shoe which bore directly upon the inner side of the chain. It was claimed that this would prevent the accumulation of dirt or stones inside the chain, which was of a channel section. The somewhat complicated layout of the steering mechanism was necessary in order that steering could be effected without tightening or slacking either chain. The linkage is quite ingenious and it is conceivable that it might be applied to some other form of machine.

This brings us back to Diplock, who, in 1899, obtained his first patent for the pedrail. The driving wheels were formed with a series of feet which were so arranged that they could conform to almost every conceivable road irregularity. In describing his invention, Diplock stated that the pedrail system "places the feet on the ground, each supporting a roller or edge and a short rail supporting the load is levered along by the spoke, over the roller. "In the ordinary railroad," said Diplock, "a rail is laid down and wheels run over it. In the pedrail wheels or rollers are laid down and the rail is run over them. The principle is the same only the railway is inverted."

As can be seen by the illustration,

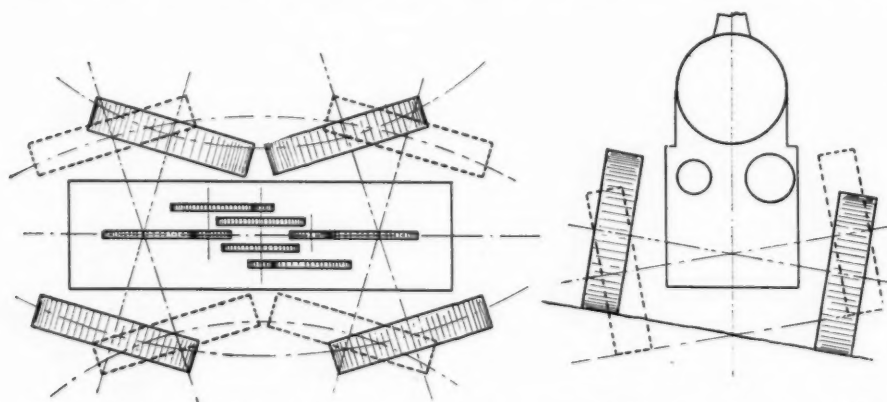
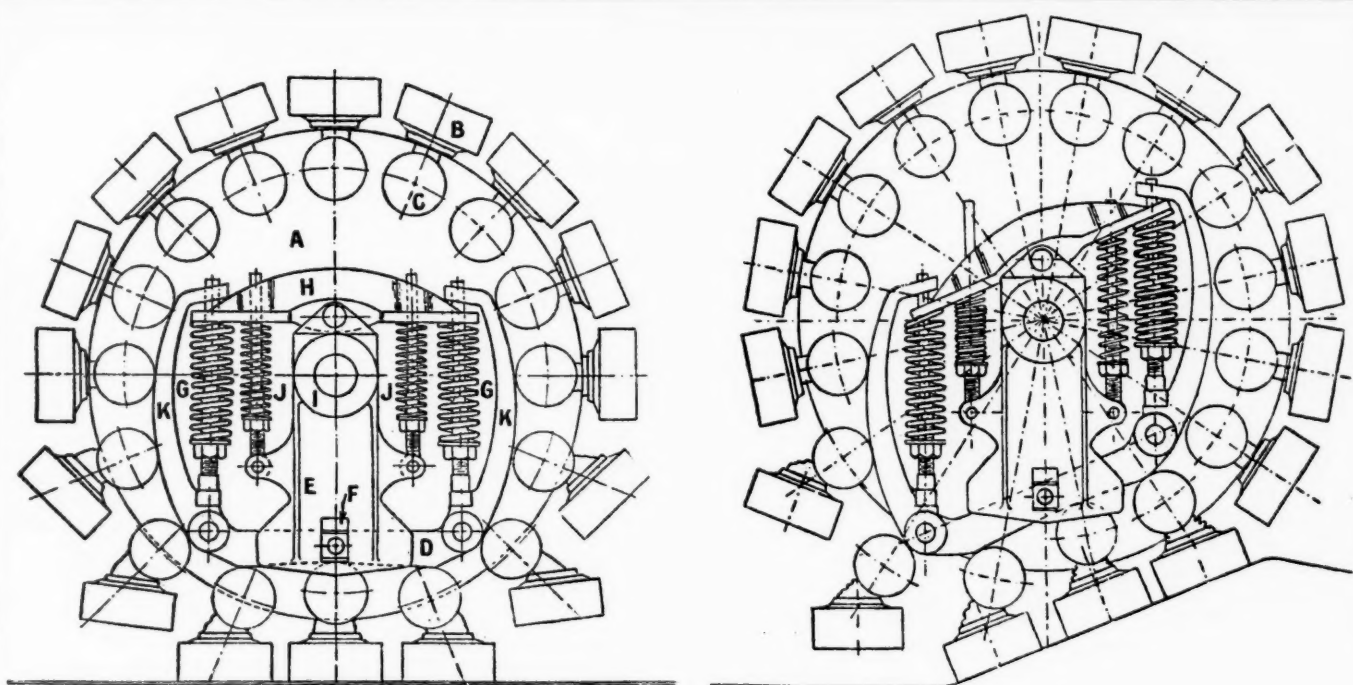
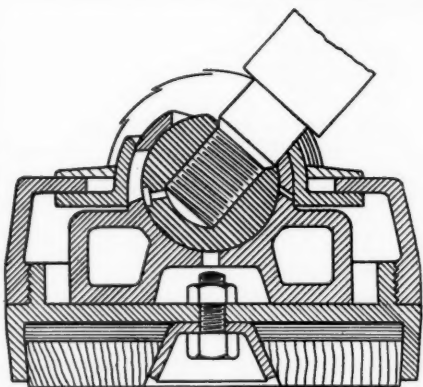


Diagram of the original Diplock four-wheel drive patent. An engine on these lines was actually constructed and did good work

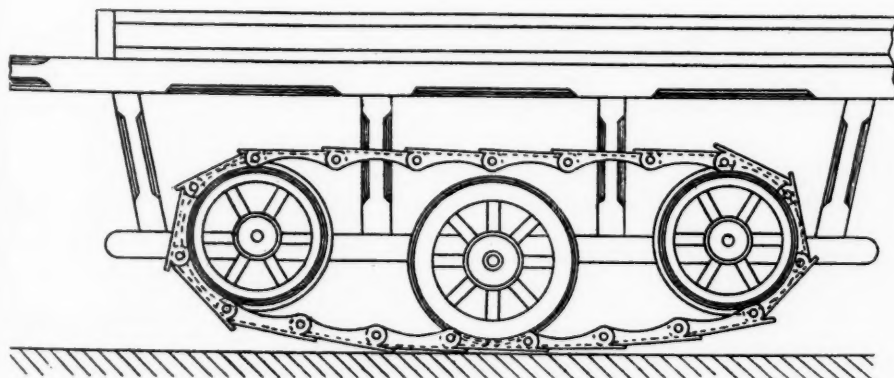
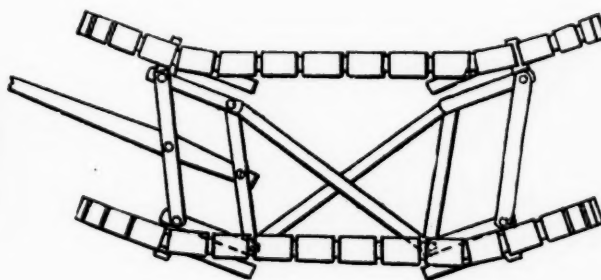
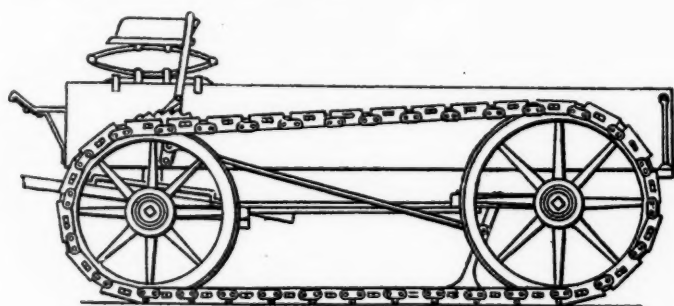
*The data from which this article was written, and the illustrations, are taken from *The Engineer*, London, which published a series in issues from Aug. 10 to Sept. 14, inclusive, this year.



Stages in the Evolution of Creeper Drive



Above — Diplock's pedrail wheel in its original form.
Left—Detail of the attachment of the foot to the spoke on the Diplock wheel



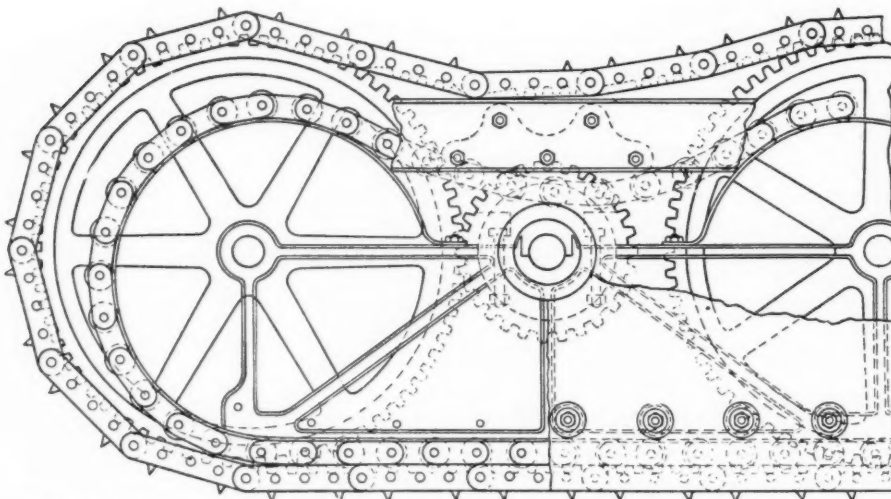
Above — The Justice and Johnson machine which had as its special feature the ability to steer without altering the chain tension. Left — Walker's design for a trailer claimed to be adaptable for a tractor

the driving wheels of the pedrail where formed of a series of feet which were driven in the following manner: Referring to the letters on the cut, *A* is a steel disk keyed or fastened in some other manner to the driving axle. Mounted in the disk and arranged so that by means of a spring, not shown in the drawing, they are continually pressed in toward the axle is a series of driving rods. These act as spokes and each of them is fitted at its outer end with a foot *B* pivoted by a ball-and-socket joint so that it can turn to any reasonable angle to suit the surface of the road, either forward or backward or sideways.

Action of Pedrail

Fixed to one side of each spoke and projecting beyond the disk *A* is a wheel or roller *C*. Hanging from the axle is a flat plate or guide *E* to which a rail *D* is pivoted. The pivot of the rail is free to move up and down in the slot in the plate. The rail supports the vehicle by two springs *G*, the upper ends of which press against the lever *H*, which in turn is pivoted to the top of the axle box *I*. Two other springs *J* are fitted to stay lever *H*, and two guides *K* are provided to lead the roller underneath the rail.

The disks with the spokes, rollers and feet revolve, but



The Lombard chain track of 1901, later developed into a practical machine

the axle and its hanging lever, guides, rails and springs do not revolve. The result is that as each wheel comes in contact with and passes down the face of one of the guides *K* the wheel and with it the spokes and foot attached to its foot. By turning the railway upside down in the way Diplock describes his invention, the parts coming in contact with the road are broken up into a number of comparatively small feet which can turn in varying directions. The feet did not come upon the ground in perfectly regular sequence because owing to the detail of the wheel construction first three feet would be on the ground and then two, simultaneously. Much

The sliding spoke may be regarded as representing a horse's leg or lever, each leg being pivoted by an ankle joint to its foot. By turning the railway upside down in the way Diplock describes his invention, the parts coming in contact with the road are broken up into a number of comparatively small feet which can turn in varying directions. The feet did not come upon the ground in perfectly regular sequence because owing to the detail of the wheel construction first three feet would be on the ground and then two, simultaneously. Much

was claimed by Diplock on account of the feet being perfectly free to move and in no way tied together.

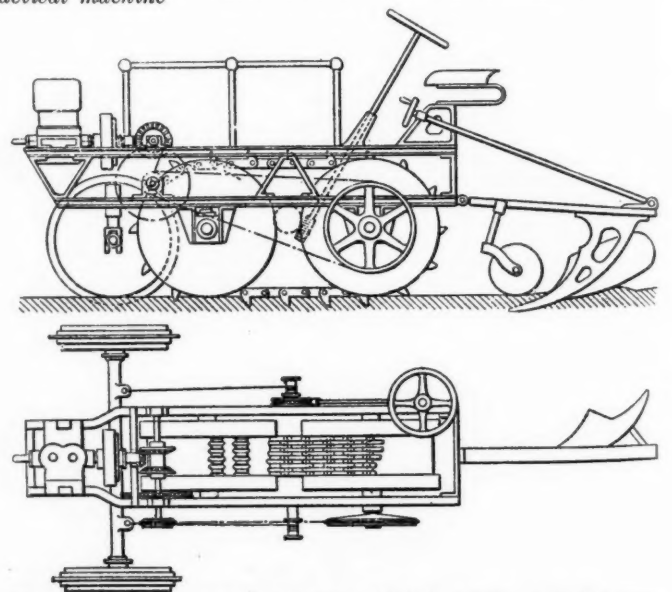
In 1912 Diplock turned his attention to the chain track or creeper type of machine, and it is noticeable in several patents granted to him about this period that he adhered very strongly to the idea of providing the greatest possible elasticity at the point where the feet or similar part came in contact with the ground. This, however, should not be mentioned here when various intermediate types of machines were evolved between this first endeavor and his later inventions. The section of the foot shown in the cut is worth studying, since the greatest care was taken to reduce friction at this point. The big ball joints were very carefully protected against dust and mud, while the spoke itself reciprocated on ball bearings.

Lombard's Invention

In 1901 Alvin O. Lombard of Maine made his first appearance in the creeper-drive field, his invention being intended mainly to precipitate log hauling on packed snow and under other adverse conditions. His idea is almost completely explained by the illustration, which shows that there were two separate chains, one a track chain furnished with spikes for gripping the ground and the other a roller chain on which the weight of the vehicle was supported by means of a slipper.

In the following year, 1902, Richard Simms of England obtained a patent for something extremely similar to the original Bates steel mule. That is to say, there was a pair of wheels carrying a short length of driving chain on the ground and two steering wheels set forward of the drive and placed well apart. As in the case of Lombard's invention, this is almost entirely explained by the illustration.

At about this stage in the history of the creeper drive it was given a great impetus in Europe owing to the interest shown by the British war office. This will be dealt with in the next of this series of articles.



Simms plowing tractor of 1902, which is very much the same in layout as the Bates steel mule

Putting Creeper-Drive on Trucks

Conversion of Stock Model Truck to Creeper Type Easy—Wide Use for Such Vehicles in Ammunition Transport

By Edward Salisbury

ONE of the greatest services that can be rendered by the automotive industries to-day, in the traction of artillery, is the adaptation of a creeper tread to a standard high-grade rear wheel drive truck.

The truck so adapted, from the standpoint of the present spare parts, should have only a minimum of modification. The caterpillar track suggested in a truck tractor of this type is the pedal, or foot, resting on a roller chain which in turn bears on the lugs of the caterpillar track.

The trunnion mounting of the foot permits a tilting movement in a vertical plane without causing the frame to plunge. The foot may be sprung to the frame or rigidly connected to it. Following closely standard truck practice, it appears logical to flexibly mount to the frame the cross shaft to which the track foot is attached.

No modification in the chassis layout other than the track is thought desirable, except possibly two independent rear brakes by means of which the tractor may be steered independently of the front wheels by alternately braking one track or the other. A high torque inertia in front of the clutch is also a desirable feature. Rather, however, than increase the flywheel diameter to a dangerous point, it might be better practice to augment the number of engine cylinders and to raise to a maximum the torque mass within the crankshaft.

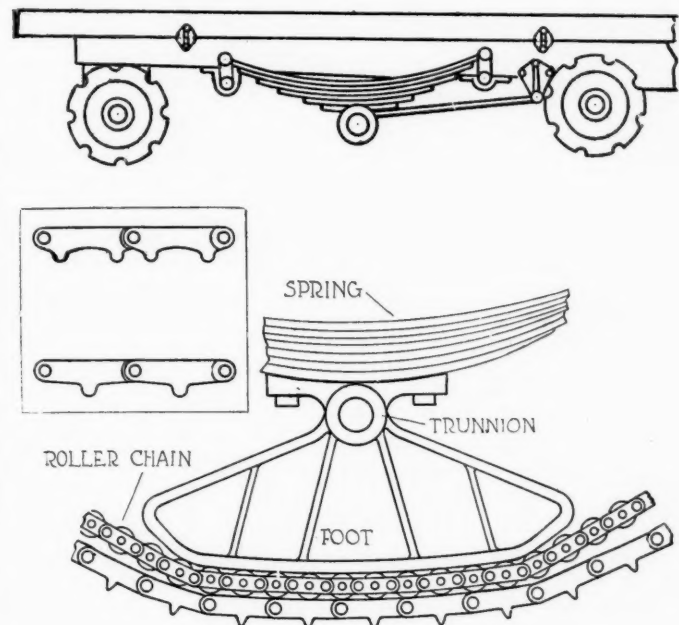
The chief criticisms of the agricultural type of tractors in European army service are: low speed, inability to rapidly follow the road, excessive vibration, poor suspension, excessive plunging and heaving at a speed of 3 m.p.h. or better, too tight a track, faulty track lug design, incorrect position of the driver, and an infinite variety of trouble in the track clutches and brakes, track rollers, etc.

In a standard truck job the mechanical difficulties in engine, transmission, springs and bearings have been, to a great extent, eliminated. Furthermore, since the

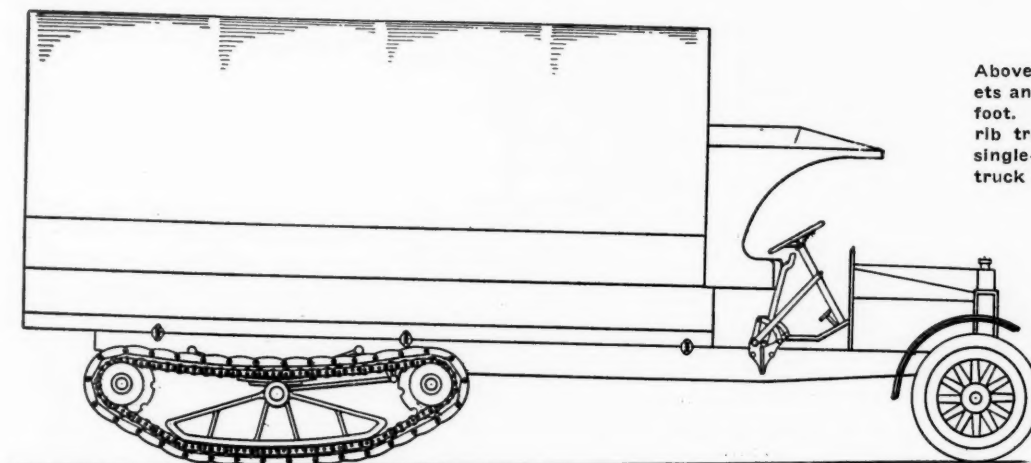
inception of the industry the front wheel spindle type axle steering has been found correct practice for road conditions. In this type of steering there is an automatic self-righting action of the wheels, and there is only a minimum mass inertia to be overcome by the wheels in following the ruts and irregularities of the road surface.

A brief tentative specification in the transformation of a standard 5-ton, long wheelbase truck job is as follows:

Frame, radiator, engine, transmission shaft and axlesStandard



Above—Arrangement of sprockets and detail of spring mounted foot. Inset—Conventional two-rib track lug and preferred single-rib type. Left—Five-ton truck converted to creeper drive



Front springs.....Deepened to raise height of frame.
Rear axle.....Direct connected to frame.
Rear wheels.....Replaced by track chain sprockets.

	40 Hp.	80 Hp.
Distance between centers of chain sprockets.....	6 ft. 0 in.	7 ft. 6 in.
Distance back of idler chain sprocket from center of front wheels.....	11 ft. 0 in.	14 ft. 0 in.
Wheelbase measured from center of front wheels to center of track.....	14 ft. 0 in.	17 ft. 0 in.
Width over all of the truck tractor	7 ft. 0 in.	7 ft. 0 in.

One of the difficult problems in track design appears to be the cross-ribs or grousers integral with the track lugs. It has been the practice in America to cast two ribs to each lug. Such a construction must of necessity produce considerable pounding. It is therefore preferable to cast a single rib only, permitting the tread to oscillate in coming into ground contact.

Road destruction with a properly designed track appears to be negligible. The writer has recently conducted long tests with wood, rubber, smooth steel and ribbed treads over a hard macadam road. The wooden blocks wore away very rapidly; the rubber block treads pulled away the frames of the special shoes; the flat steel treads were slightly destructive. There was some pulverization of the road surface by the pounding of the two-rib track lug, yet in the intensive test of all four types over the same stretch of road there was not enough roughing up of the road surface to appear in a photograph.

The field in ordnance work for a truck tractor as outlined is almost without limit. The factor of speed in the movement of artillery material is of first importance. No type of road contact in a road vehicle under all conditions has equaled the creeper tread. In actual draw-bar pull and ability the creeper tractor-truck will far outdo the four-wheel drive, and there is less complication of transmission, fewer joints, and from the standpoint of steering and handling it is a standard job.

A field awaits a good manufacturer, as there are no patent restrictions.

Better Body Engineering Wanted

Present Methods Insufficiently Durable—Should Banish Wood Completely

WITH few exceptions, the passenger-car bodies of to-day are constructed on an inherently wrong principle—and represent the sacrifice of utility to initial appearance and low cost. Consisting of a skin of metal, drawn tightly over a wooden framework, cracks and failures soon appear, and no satisfactory repair is possible. And the resale price of the car drops immediately far below its logical value.

In the old days, bodies of this type were designed for failure, hence when failure occurred it was not apparent, and did not lower the value or appearance of the car. All joints were covered by beading, and when the crack occurred, it followed the line of the joint and was hidden. But with the streamline bodies of to-day there are no joints, and no beading—an improvement when new and a weakness later.

Two Good Types

At present there are three types of construction that do not possess these faults, and none of them are well adapted to the requirements of the small manufacturer desiring a distinctive body. The first is the cast aluminum body, used by the Pierce-Arrow Co., the best, doubtless, but prohibited to general use because of the cost. The second type is that used on Dodge Brothers' cars, consisting of a die pressed and welded body, but it requires a 20,000 production before it is commercially possible.

The third type is used on Marmon cars. By this scheme the body is divided into three sections, and, though eminently satisfactory, necessitated special provisions in the design. The frame must be exceptionally rigid, and the spring suspension carefully studied out. Otherwise relative motion between the body divisions will occur, the parts will work on each other, and the doors will become loose.

For the smaller manufacturers but one solution seems evident, and that is in the direction of body standardization. Several of these manufacturers, by pooling to-

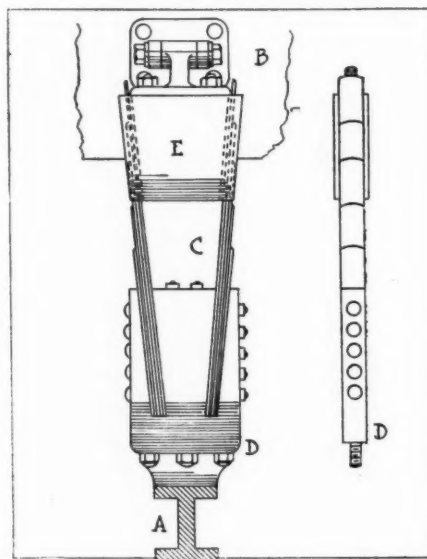
gether and using a body of the Dodge Brothers type, could so reduce the production costs that a good body would be commercially possible.

Might Differ at Small Cost

There are a number of pieces in these bodies, and it is quite probable that by having just one or two special pressings three quite different appearing bodies could be made which would have 90 per cent the same parts. The economy would not be as great, but something of this sort may bring the pressed steel construction within the reach of, say, three small producers of cars.

It is mainly a question of whether the public desire cars fitted with distinctive but shoddy bodies, or with bodies that will last as long as the rest of the car.

Spring Without Rebound Action



A RECENTLY patented spring which, according to its inventor, is entirely void of rebound action, is here shown in both side and front elevations. A is the dead axle, B is a portion of the vehicle body, C a pair of springs or sets of springs arranged in diverging relation, D an abutment for supporting the springs. The action is explained as follows: Upon the vehicle meeting an obstruction or unevenness in the roadbed, the wedge E is forced downward below its normal location, but gradually returns to its normal position. It is stated that the absorbing qualities of the spring are best when it is placed in a plane parallel with the motion of the car.

Data Wanted by Research Committee, Minneapolis Section S. A. E.

1. *Strength and durability of steel gear teeth, especially Fellows 20-deg. stub tooth, hardened and heat treated.*
2. *Effect of wheel sizes and widths and lug designs.*
3. *Tests of different fuels, carbureting devices, and*
4. *Thermal effects of details of engine design,*
5. *Governing and automatic spark timing,*
6. *Weight distribution.*

Engineers are requested to forward the committee anything they have in the way of reports which will help in accumulating information on these subjects.

MINNEAPOLIS, MINN., Nov. 8.—The Minneapolis Section of the Society of Automotive Engineers has voted approval of holding tractor demonstrations in 1918. The vote followed long discussion at yesterday's meeting. The motion made no suggestion as to what kind of demonstrations there should be, but a committee was authorized to formulate a plan for tractor tests and for obtaining engineering data therefrom.

There was an opposition sentiment in the debate over the main question of the meeting, expressed by Secretary H. C. Buffington, saying: "We should go on record to help other men along in a private way. I believe private tests are the best. It is our purpose to build up the industry, not to tear it down."

In opening the discussion A. C. Bennett and Chairman Russell Greer told of the faults found with the Winnipeg and Fremont tractor demonstrations. T. C. Menges of Waterloo, Iowa, who made and supported the motion for tractor demonstrations, said former demonstrations were rather for manufacturers and buyers, that 1918 tests should be for fuel, plowing and other kinds of farm work, different types of wheel, equipment and tractive efficiency, steering mechanism, and belt work. Each tractor should have a continuous 10-hour demonstration.

Engineering Data Needed

"If we get together and make tests the way we want them made they will be of benefit to us; otherwise they will be of little value from an engineering viewpoint," said Mr. Menges. "We want to know how much fuel a machine uses, whether the motor stands up and the tractor handles easily and does the work the way we think it ought. One object is to get the industry down to a few designs. It will help standardize the parts and result in survival of the fittest."

A letter from R. O. Hendrickson of Racine, Wis., favored something different in demonstrations instead of tests of only two hours and in expert hands. He suggested penalties for stops, refilling with oil and water and for adjustments, and awards for working tests, observers to be provided by the factories.

N. Benoni Nelson, sales manager for the Minneapolis Steel & Machinery Co., said the best way for engineers to get engineering data is to get into automobiles and go out and see what the machines are doing in the field, if they are trying to give farmers practical results. Make the observations over a period of a year and on tractors in various hands all over the country. Demonstrations

Tractor Trials Must Be Severe

Minneapolis Section S. A. E. Will
Formulate Complete Plan for
1918 Demonstrations

disorganize sales, he said. They are more harm to the tractor business than good.

Mr. Buffington argued that demonstrations are a big expense and mean wearing out one or two machines for each factory entering, and it is impossible to get the ground for proper endurance tests. He said the biggest help to the engineers would be to get out in the field where tractors are running, something in which the manufacturers would co-operate, he believed. Co-operation with manufacturers and salesmen is necessary, but the engineers are not getting data from present demonstrations. How are they going to get it? By 10-hour runs, watching the shows, or having tractors built on race automobile lines? It is possible to have a Section branch to make tests on anybody's tractor.

Endurance Runs Favored

M. R. Bass of the Dunwoody Institute, formerly active in automobile tests and runs, favored something similar to an endurance run of the old sealed-bonnet type for the tractor, which would be good for the manufacturer of tractors, the engineers and salesmen. He favored regular machines instead of special-built tractors, entered in teams of three for a run of 100 miles across country, properly classified, and handicapped if necessary, with observers changed frequently. After the road test the tractors should go into a field and plow and take penalties for adjustments. Thus weak points would be brought out.

Stanley J. Miller of the Beltrail Tractor Co. suggested that the Section appoint a field committee to go out and investigate conditions in actual operation. This would help quietly to build up the weak man. At this point Mr. Nelson said that the investigation should be through different states on different machines. He said fuel problems are the smallest things that bother the farmer. What he wants to know is if his tractor will go out.

"Demonstrations" Useless

After the salesmen's interest in tractor demonstrations had been brought into the discussion, Mr. Menges reminded his auditors that any action to be taken was to be taken by a Section of automotive engineers. He said in five minutes he could make up his mind about a tractor if he could see it working. That reading circulars and seeing a tractor dead on the floor was no good.

"As representatives of the engineering fraternity we should support demonstrations," he said. "Before sales-

men can go out we have got to lay the foundations for the best tractor to do business. We are at the foundation of the business. If a man has a good tractor to sell he can sell it. We should support demonstrations for our own benefit."

The chairman said that if a test is held for *salesmen* it is only a fizzle from the engineering viewpoint. A test should be for the engineers. He believed each factory might give a tractor to farmers and then a train trip might be taken four times a year to watch them work. He said the S. A. E. had prepared a standard official test for gasoline automobiles. Something along this line might be prepared for the tractor. After a manufacturer had lined his tractor on this basis he might have a certified statement for his tractor. The tractor show is the salesmen's chance, he said.

Salesman Can Sell Good Machine

J. S. Clapper of the Toro Motor Co. said if the engineers and manufacturers give the salesmen a good machine they can sell it. He believed the tests should be utilized to help build up competitors, and it can be done in a private way. Dean J. R. Allen of the college of engineering of the University of Minnesota offered the services of his department to the Section at any time. He said he would like to see a tractor working on a hill farm at an angle of 45 degrees.

Chairman J. L. Mowry of the Committee on Research and Data reported suggestions for procedure, at the same time submitting tests of clevises and a chart tabulation of curves for belt widths. The latter was explained by A. F. Moyer of the committee. The results are to be turned into the standards committee.

W. J. McVickar reported the committee on engineering practice would meet the first and third Thursdays of each month. Subjects have been divided under three groups, design, materials and shop methods. Present S. A. E. standards are to be reviewed to see what are suitable for tractor work. It was reported that some can be applied to tractor work if various sizes recommended are carried to larger dimensions. Many are found to be as suitable as for the automobile.

Engine Starter Demonstration

Tractor starters will be demonstrated at the meeting Dec. 5 by the Wagner Electric Company. It is the annual dinner night, and three members of the national standards committee will attend: Chairman M. W. Hanks, H. L. Horning of Waukesha, Wis., and Fred Glover of Rockford, Ill.

Chairman C. T. Stevens reported dates for other meetings as follows: Jan. 2, 1918, "Tractor Cooling," A. B. Modine, Modine Mfg. Co.; Feb. 6, "Tractor Fuels," Professor J. L. Mowry of the University of Minnesota Farm School; March 6, "Tractor Gears," covering materials rather than ratios; April 3, "Methods of Lubrication"; May 1, "American Tractors in Europe."

Protect Breathers from Dust

MANUFACTURERS have been slow in adapting air washers to their product. In the truck field particularly owners are demanding air washers of some kind, and it is only a matter of time before some manufacturer will incorporate it as part of the standard equipment. There are at present three distinct types of air cleaners on the market, each possessing merit, and each supplying clean air to the engine. In the first, all the air is passed through a water bath, and the dust and dirt washed from it; in the second, the dust is removed by centrifugal action, and, in the third, the air is passed

through a chamber in which are baffle plates covered with a dust-retaining material. None of these are experiments, but is a carefully developed and tested product.

It is not sufficient to provide an air cleaner at the intake manifold alone. Dust can likewise enter the crankcase through the breather pipes, and some means to prevent this must be provided. Truck owners do it by simply tying a muslin bag over the breather pipe. The manufacturer can render this unnecessary by placing a small flap valve at the top of the breather tube, or by providing a fine mesh screen that will trap the dust.

It is in the truck field that the need is most evident at the present time. But it is no less necessary on passenger cars, because of the fact that it will reduce maintenance costs and prevent oiling troubles.

Combined Light and Ignition Switch

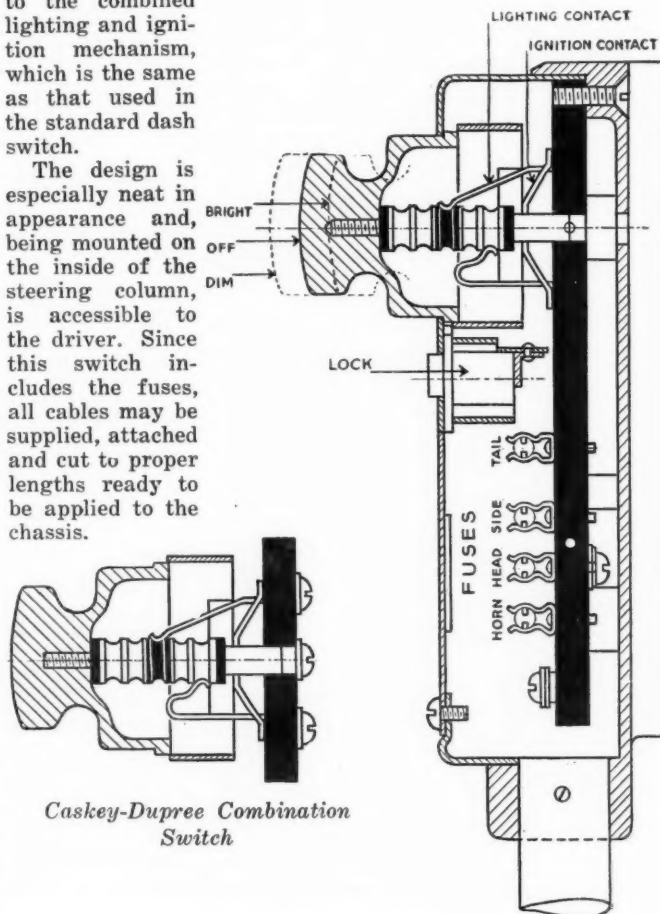
THE Caskey-Dupree Mfg. Co., Marietta, Ohio, is offering to the trade a line of automobile switches, including both lighting and combined lighting and ignition in either dash, steering column or panel types.

Phosphor bronze contact fingers are used throughout, these being of liberal proportions, and, in the case of the ignition fingers, backed by a spring steel strip to assure proper contact pressure.

The opening and closing of the ignition circuit is controlled by rotating the handle, and the lighting circuits are controlled by an in and out motion. Each of these functions is independent of the other. When the handle is in the extreme "in" position all lights are on bright, and when in the extreme "out" position, dim; when in the center position, all lights are off. This method of controlling the lighting circuits makes the dimming operation exceptionally easy to perform.

The steering column switch includes a fuse box with four fuses to be included in the various lighting and horn circuits, in addition to the combined lighting and ignition mechanism, which is the same as that used in the standard dash switch.

The design is especially neat in appearance and, being mounted on the inside of the steering column, is accessible to the driver. Since this switch includes the fuses, all cables may be supplied, attached and cut to proper lengths ready to be applied to the chassis.





The F O R U M



Knowledge Needed in Balancing

By N. W. Akimoff

IT has always been contended by the author that Balancing is not at all a shop method, like hardening a delicate piece of work or cutting a freak gear, etc.; but, on the contrary, it is a separate chapter of mechanical engineering, delicate and requiring, for proper handling, a rather thorough knowledge of the elements of Rigid Dynamics.

It is therefore absolutely impossible to educate a laborer, even if most willing, or a mechanic, even if very skilled in general, to take care of all the problems that might arise, although in some cases the author was successful in getting up tables or curves, by which some of the simpler problems can be handled by a man who can only read and write.

In general, however, much better efficiency and much greater production would result if a responsible mechanical engineer were placed in personal direct charge of the balancing department, having under his supervision the men who work the balancing machines, those who actually do the drilling or grinding, etc.

Good Output Possible

One engineer of this kind would easily take care of two balancing machines and all corresponding help, and would, himself, constitute a positive guarantee against all sorts of mistakes due to ignorance, stupidity or carelessness.

The task of such an engineer would be: to verify, in each case, that perfect balance has been actually found on the machine, by its operator; to actually lay out the holes to be drilled or spots where weights will be added; instantly to determine the proper amount of metal to be added or drilled out; to see to it that the operations have been carried out exactly as per his instructions, thereby rendering it unnecessary to check the work in the machines; and finally to have his stamp put on the piece, for the perfect balance of which he would then assume all responsibility.

It would thus be not at all unlikely to expect that such a man could have between 125 and 150 articles balanced per day of 8 hr., including static and dynamic balance; the actual cost of labor of balancing would then be probably about 22 cents and not over 25 cents per piece, provided that the equipment is made up of perfect balancing machines and all necessary facilities, properly planned and located.

An engineer of this kind should possess certain qualifications for successful performance of his duties. The author's practical experience in the field of balancing has clearly demonstrated to him that he must be fully prepared to be confronted with a great variety of problems, for which an answer must instantly suggest itself in each case.

A Formidable Examination

Were an examination ever to be held for the position of such a balancing engineer, it should, in author's opinion include the following queries (the recommended books being *Worthington's Dynamics of Rotation* and *Slocum's Theory and Practice of Mechanics*).

1—What is Momental Ellipsoid? Its relation to Ellipsoid of Gyration?

2—Make a sketch of three or four bodies of which the Momental Ellipsoid about their centers of gravity is merely a sphere.

3—What six quantities are necessary for constructing a Momental Ellipsoid?

4—What are products of inertia? How can a centrifugal couple be derived from the expression of a product of inertia for a body rotating about an axis?

5—A pulley of which the rim-weight is 100 lbs. and the mean diameter 24 in., is brought to its full speed of 900 r.p.m.

in four seconds, accelerating uniformly. What is the rim stress at the beginning of the third second, according to a well known rough formula?

6—What could be properly termed *drafting room balance*, and what *machine shop balance*?

7—Give an analytical definition of Static Balance (c. of g. is on the axis of rotation); also of Running or Dynamic Balance (products of inertia vanish).

8—If someone stated the capacity of a dynamic balancing machine in inch-ounces, how would you explain that this is an error? State in what units can dynamic balance be correctly estimated.

9—How would you balance a four-bearing, three-throw shaft? What happens when such a shaft is doubled into a six-cylinder shaft?

10—Show why it is wrong to balance a six-cylinder shaft on three planes; show when it leads to smaller and when to greater errors, and, by drawing a sketch, estimate the numerical value of unbalance, thus deliberately introduced.

11—The following definition of dynamic unbalance has been proposed: cut the body through its center of gravity by a transverse plane; if the center of gravity of each half lies on the axis of rotation, we have dynamic balance; if not, the body is dynamically unbalanced (static balance assumed to be perfect). Show why such a definition is wrong and misleading. Show by a sketch, how a body may be in perfect dynamic balance, although the center of gravity of each half is not on the axis of rotation; show by a sketch how a body can be badly unbalanced, dynamically, although the center of gravity of each half lies exactly on the axis of rotation.

12—In how many ways can a straight rod vibrate, torsionally, if free (say, floating in mercury bath)? a. Theoretically. b. Practically?

13—In how many ways can a straight rod vibrate, torsionally, with a flywheel on each end? a. Theoretically. b. Practically?

14—In how many different ways can a six-cylinder seven-bearing crankshaft with a flywheel vibrate, torsionally? a. Theoretically? b. Practically?

15—In how many ways can a short coil spring vibrate under its load? (See author's suggestion as to the use of slide rule in this connection, *Amer. Mach.*, Aug. 24, 1916, p. 318.)

16—In how many ways can a very long coil spring vibrate (say 20 ft. long, suspended from ceiling) longitudinally? In theory? in practice?

17—Imagine a beam, resting on one end and spring-supported on the other, the load on the spring being say W. Will the spring vibrate in exactly the same manner as if loaded simply by a concentrated weight of the same value W? Why so, or why not?

18—What is the cause of a balancing machine going "wild," sometimes without any apparent reason? Is this cause mechanical, electrical or both?

19—What happens if the attempt is made to balance a body, dynamically, without first securing perfect static balance?

20—What are the general considerations governing the estimation of the sluggishness or residual static unbalance, as secured on the ways?

21—In a floating bearing machine, where the body is apparently balanced on one end, what is the exact meaning of such a phenomenon, and what in the meanwhile is happening to the other end?

22—In the absence of torsional vibrations, what is the correct explanation of "periods," say at 11 m.p.h., and then at 19 and 35 m.p.h., or so?

23—What is the object of balancing a four cyl. or eight cyl. shaft, since the reciprocating mechanism itself cannot be in balance?

- 24—Why can a six cyl. shaft be put in ideal balance?
- 25—After the unbalance has been indicated by a balancing machine, static or dynamic, how many seconds would it take you to locate the proper places in which to drill and to determine the size and depth of drill?
- 26—Assuming that all dynamic unbalance is due to a couple, acting on a short leverage on one end of the shaft; and that you have corrected it by introducing another couple, of opposing sign, on the other extreme of the shaft, also on short leverage, what harm have you done, if any?
- 27—Explain, how, in case of a very long body, a fraction of the couple can be taken out on one portion thereof, and the balance toward the other end. Give an electrical example where this often must be done.
- 28—What is the similarity and what is the difference between Rotation about a point and Rotation about an axis?
- 29—Give not less than seven examples of Synchronism.
- 30—Explain, analytically, synchronism and damping, dead beat condition, small oscillations and normal modes thereof.

One Reason for Slanting Windshields

By Charles A. Smith

LOOKING over a back number of AUTOMOTIVE INDUSTRIES I noticed an article giving the reasons for the practice of slanting the windshield backward, namely, to reduce the wind resistance, and for the improved appearance of the car. In my case neither of the reasons stated is the most important. The most noticeable advantage in driving with the slanting windshield is the increased ability to see the road, due to the obliteration of all reflected light from the rear. The proper slant of the windshield reflects all rear lights downward instead of into the eyes of the driver.

This is of great importance when driving away from the sun, or when entering a very shady wooded section of highway, or when driving at night in a lighted thoroughfare. Try it out and you will always tilt your windshield unless you have your top up.

Safety Gasoline Storage and Supply System

A GASOLINE or oil storage and transferring system, suitable for installation in either the smallest filling station or the large factory, has been developed by the Hydraulic Oil Systems Corp., Detroit, Mich. This system operates on an entirely new principle, whereby the oil or gasoline is floated on water and forced from the tank by means of water pressure from the water main, or other source of water supply. The main feature of the system, outside of economy and simplicity of operation, is the fact that all air is excluded from the gasoline, preventing waste and the formation of dangerous gases.

In brief, the system comprises the usual storage tank, to which the water is admitted at the bottom, and the oil or gasoline drawn out at the top, the tank at all times being completely filled. The water applying pressure to the tank is carried in an auxiliary float tank, whose upper level is kept constant through a ball float valve on the water main. This level varies with the nature of the liquid to be transferred, being just high enough to completely remove all of the liquid, but not high enough to carry the water over when the liquid has been completely removed.

When it is desired to fill the tank with gasoline, or oil, all air is first expelled from the system by filling the tank with water. The combined water and drain valve is then opened, the gasoline or oil poured in the filler opening, and the water displaced through the bottom of the tank.

To draw off the gasoline, or oil, the water valve is opened, admitting water to the bottom of the tank, and the gasoline is floated, or forced out the exit pipe. Baffles over the entrance break up all currents, and prevent the mixing of the water with the oil, or gasoline. It is a well known fact that water, and gasoline or oil will not mix readily, and when agitated, separate quickly. As the gasoline or oil is above the water, a pure unmixed product is delivered to the draw off.

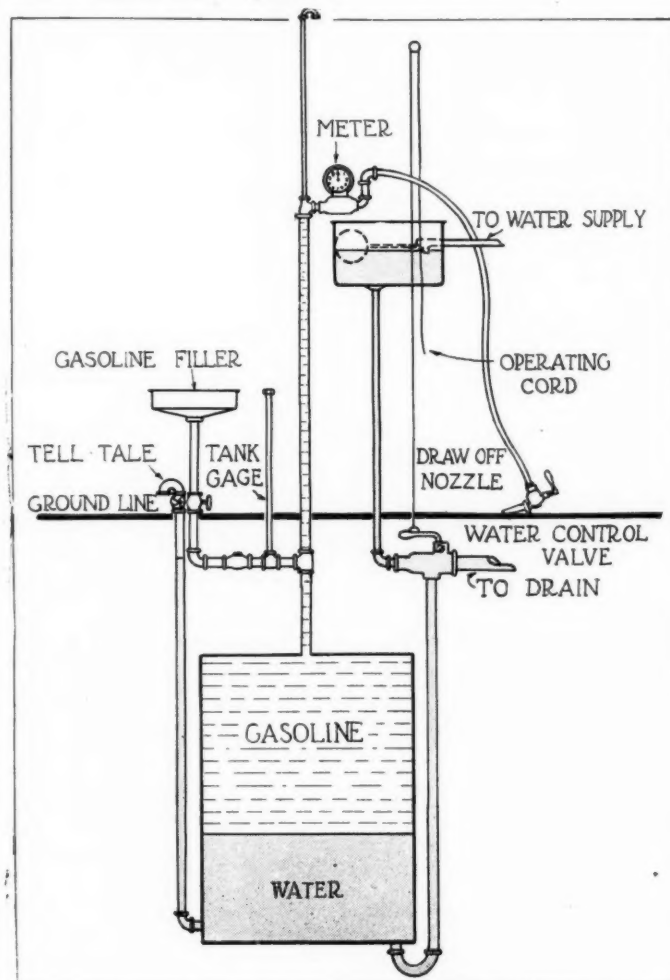
In case of fire, the possibility of flooding the tank with water, and forcing the gasoline out is removed, as the drain valve is open at all times, flooding would simply result in the water passing through the tank without affecting the gasoline level. On the other hand, leakage of the operating valve would have no effect beyond drawing gasoline from the auxiliary tank and passing it directly out through the drain. To force gasoline from the tank, it is necessary to open the operating valve and admit gasoline through the entrance at the bottom of the tank.

The main feature of this system is that it prevents the possibility of loss of the more valuable parts of the fuel through evaporation. Evaporation cannot take place without air, and the air is excluded at all times by the presence of the water.

The system is supplied for the smallest filling station or the largest factory. Though the cost is from 10 to 25 per cent more than an equivalent pump system, it is claimed that the saving in gasoline and ease of handling will tend to offset the initial cost. Water costs vary from 25 cents to 50 cents

per 1000 cu. ft., and this will transfer about 7000 gal. A feature that will recommend the system to the larger installations, is the fact that in the case of heavy underground tanks, surface water flotation is a practical impossibility. The tank is full of liquid all the time, and hence the buoyant effect of the surface water is neutralized.

The amount of gasoline drawn off at any one time and the total amount drawn off to date are registered by means of a meter mounted at the draw-off panel. And the rate at which draw-off is possible depends only upon the rate at which water is admitted. About 30 gal. in 45 sec., on a filling station installation, is possible.



Hydraulic safety gasoline supply system

Bailey Differential for Heavy Trucks

New Design on Original Principle to Suit Truck and Tractor Requirements—Special Brakes Supplied for Short Turning With Creeper Drive—Will Transmit 130 Hp. at Tractor Speed

A SOMEWHAT difficult job was recently undertaken by the Bailey Non-Stall Differential Co., Chicago. This concern, which heretofore has confined its product to the passenger car field chiefly, was called upon to construct a differential for heavy truck purposes, with the limitation that the carrier be not over 13½ in. diameter. This differential is capable of handling the maximum torque of a 6-cylinder engine having a bore and stroke of 5¼ by 7 in. respectively and developing 130 hp. at 1000 r.p.m. Incidentally this marks the entrance of the company into the manufacture of differentials for commercial vehicles, and arrangements have been made to build these in sizes to meet practically all needs. The differential herewith illustrated was designed by John Whyte, chief engineer of the company.

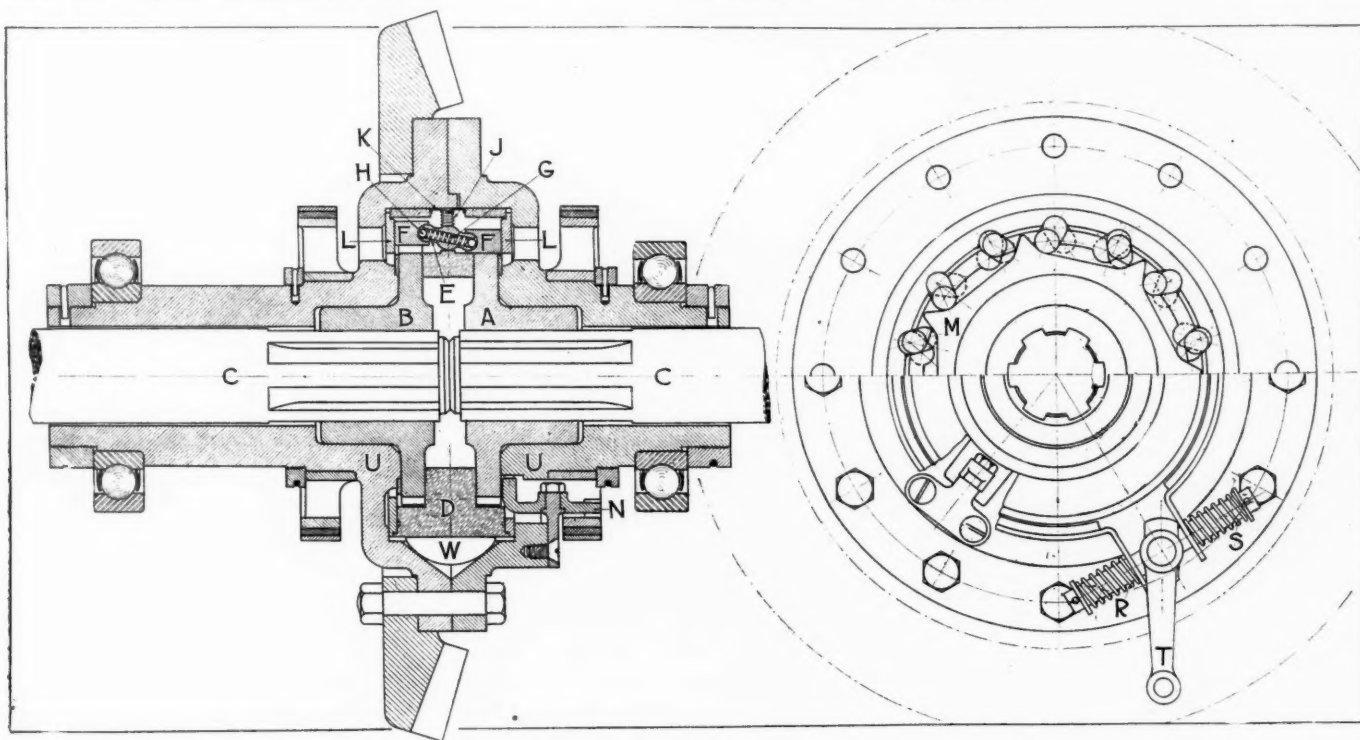
The principle of operation is the same in this large truck differential as on other models of the Bailey, excepting for a few minor changes in the pawls or tilting members to meet new conditions. Some idea as to the size of this differential can be gained from the fact that the outer race of the supporting bearings has an over-all diameter of ¾ in., while the balls are 1 in. in diameter. The axle shafts are 2½ in. in diameter and the total width of the carrier is 18 in.

A new feature consists of placing band brakes on each side of the carrier, whose function it is to release at the will of the driver either side of the differential when a sharp turn is made, as for example when a creeping-drive truck is run around a corner. The action is to hold the inner wheel out of engagement and simply drive the outer in the same manner that the helmsman of a side-wheel steamer turns his boat. In doing this the Bailey company points out that there is no reduction in power, inasmuch as there are no gears in the differential.

Essentially the differential consists of the right and left-hand ratchets, *A* and *B*, attached to the ends of the splined shafts, *C—C*. The ratchets are made of chrome-nickel steel and mounted face to face in the center driving unit, *D*. The driving members consist of 14 tilting members, or pawls, *E*, working in conjunction with hardened pawl pressure rollers, *F*. Each tilting member is drilled longitudinally for a coil spring, *G*, bearing at each end on steel pressure balls, *H*, which operate in spherical seats cut in the ends of the rollers, *F*. The pawls are held in position by the spring, *J*, bearing against a spring cap, *K*. Retaining plates, *L*, are fitted on each side of the center unit and serve to keep the rollers in place.

Between the ratchets and retaining plates are the release plates, *M*, the latter being cut with seven rising cam surfaces, which, when the movement of one of the plates is slightly retarded, causes the 7 rollers on that side to be pushed up in the oval slots and out of the circular notches of the ratchets. The same action of the rollers takes place in ordinary use of the differential, the release plates being merely acted upon when the band brakes are operated at the discretion of the driver. Application of the brake causes the release-operation lever, *N*, to rotate slightly, which in turn moves the release plate sufficiently to throw out the rollers. Contraction of the brake band is secured by compression springs, *R* and *S*, the lever, *T*, serving to hold it normally out of action.

The center driving unit is secured to the two halves of the carrier by 4 Woodruff keys and the ring gear bolted in place with 12 ¾-in. machine bolts. The latter incidentally serve to hold the two parts of the carrier together also, reducing the cost of production.



Section of Bailey differential for heavy trucks and tractors, with which is combined a brake steering device

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The Chrome Shortage

WHEN an attempt is made to analyze the reasons for the orders from the Government to reduce the shipments of alloy steel, about the only concrete example of shortage among the alloying substances which can be found is that of ferro-chrome. Without taking up the question as to whether there is or is not a plentiful supply of ferro-chrome in the country to fill our needs and the needs of our allies, it is well worth while to consider what the effect would be in the automobile industry if it were impossible to secure any more of the ferro-chrome.

Probably the most important function of chromium is to permit a greater latitude in the handling of the heat-treatment of a given steel. It has often been claimed by steel makers that practically the same results as have been obtained with chrome steels can be duplicated by carbon steels and other alloys if the heat treatments are held to close limits.

Naturally it takes a longer time and more careful work to accurately hold the heats than it does if a greater amount of latitude is allowed at the furnaces. Therefore, chromium may be classed as a material which aids in the production of the finished

product from a commercial standpoint. As far as a shortage of ferro-chrome holding up the production of automobile concerns, there does not seem to be any reason to believe that such could be the case.

Chromium is used to a large extent in gears and shafts throughout the transmission system of the car, and it gives an excellent material for resisting torsional stresses. Chrome steel has the value of combining, when in the hardened or suddenly cooled state, intense hardness with a high elastic limit. These properties combine to render it proof against sudden shocks, a condition which is rare in a hard steel. Chrome steels generally have about 2 per cent of chrome and from 0.80 to 2 per cent of carbon. The S. A. E. chromium steels have from 0.95 to 1.20 per cent carbon and from 1 to 1.2 chromium. The manganese in these steels run from 0.20 to 0.45 per cent and the phosphorus and sulphur not over 0.03 each. Owing to the property of the chrome steel of resisting violent shocks it is used practically universally for armor plate with nickel.

Use Ready Plants

IF there is any tendency toward the building of new plants for war munitions when there are plants that are suitable, already in existence, this tendency should be checked NOW.

If there are plants that are eager to take government orders, and these plants are equipped with good machinery and have at their disposal labor capable of making any of the government products, let these plants be used at once.

There are plants springing up all over the country with marvelous rapidity which are designed to carry out some particular line of government work. This is as it should be. These plants are no doubt necessary; but if there are other plants that are begging for work that they can do and do well, let the government use them.

It does not seem correct for the government to lend money to one man or group of men, to build a plant for the purpose of engaging in war work when there is another group of men with a plant all ready to do the same class of work, provided they could get the order from the government.

Inferior Sheet Metal

COLD short sheet steel is giving trouble in automobile parts where dependence is placed upon its quality to withstand a limited amount of bending stress without cracking. The fault is not with the manufacturer, because he has not reduced his appropriation for this material, but the reason seems to lie in the fact that the mills are turning out an inferior grade of material due to the fact that they are working under higher requirements for speed than ever before.

The selection of good sheet metal is one of the most difficult tasks that the manufacturer has to face to-day. It is comparatively simple in some lines of material to detect an inferior run, but in sheet metal this is not the case. The composition may be all that

is desired from a chemical analysis standpoint, and yet the physical qualifications of the material will fall far below normal. The reason for this is, of course, due to hasty and inaccurate treatment at the mills. The rolling of sheet metal at improper temperatures, producing the cold short sheet, and the presence of too much slag found because of hasty mixing or failure to properly clean the crucibles, is something which in ordinary times would not be permitted by any good material source. Yet under the urgent demands for sheet metal there is no doubt but that a great amount of material which is not up to par has come through.

More Now Available

The situation as far as sheet steel is concerned is easier than it was a month ago, when it was practically impossible to secure any great quantity of it. While the supply has gained rapidly on the demand during the last month, the fact still remains that the quality is considerably off. This is a matter which should be adjusted between the mills and the consumer, as in the long run it is bad economy to turn out a product which does not have the life which it would have if a little longer time were afforded the mills in order to more accurately meet the proper temperature condition in rolling.

A Staple Industry

IN suggesting the curtailment of passenger car production in the United States the authorities responsible have cited the cases of England and France, where such production practically ceased in 1914. The argument is that passenger cars were cut off as non-essentials, and so may be similarly cut here.

This view is based upon a total disregard for the meaning of the facts.

In 1914, up to Aug. 31 the exports of automobiles of all classes from England totalled \$17,204,475, while imports of the same sort amounted to \$27,474,700. In 1914 the automobile exports of the United States totalled \$40,136,565. In the same period the American imports were \$620,493. In other words, before the war America was exporting six times as much automobile product as she imported, while England was importing nearly twice as much as she exported.

America Main Source of Supply

This means just one thing, namely, that America is the main source of supply of road transportation for the world. That the whole world looks to America for vehicles, just as it looks to Manchester for cotton goods.

England did not restrict the much-needed labor of the cotton and cloth mills more than could be helped, because this industry was one of those in which England excelled. She has done all she can to keep going this staple industry which brings so much money to her shores, even though she is now making much more cloth than is necessary for the

prosecution of the war. England's greatest trade will not be allowed to go to ruin. Similarly America must not let her automobile business suffer. Not only from the desire to keep a great industry that is a source of revenue to the country, but because the civilized world needs American automobiles just as much as English cotton goods.

Industrial Relationship

THERE is no problem more important to the manufacturer to-day than that of industrial relations. High wages coupled with extraordinary demand create a situation where workers may be independent, not only of their jobs, but also of the employer, with a result that includes costly labor turnover, increased accidents, extravagant time demands, exorbitant accident compensation and other like evils. And to offset this situation employers have turned to the establishment of better industrial relations by means of a bureau in charge of a director whose duties include the arrangement of working shifts, equitable wage and salary payments, recreation, education and so forth.

Difficult Work

These duties, determining the contentment of the workers, regulating labor turnover, costing much in money to the employer, are important. The novice who attempts to direct such work discovers himself in a whirlpool of difficulties. In place of contentment he may breed greater discontent. In place of co-operation he can work discord. In place of a situation where workers and employer derive mutual benefit he may create a situation intolerable to both. The inexperienced director may be dictatorial. He may be paternalistic. He may be most anything but the human, humane, comprehending and experienced leader who can successfully perform the difficult and troublesome task of holding thousands of employees at their jobs.

A Wrong Choice

One instance of this sort was recently developed when a large company installing an industrial relations system appointed a young man to the directorship of the work merely because he displayed a liking for baseball and organization. The new director because of his lack of knowledge has misnamed his department in a way which links it with such philanthropic ventures as settlement homes and bread lines. The entire system of this company, now several months old, is as yet only a tentative one, and the cost considerably more than the results. The prospects for the future appear to point to a greater cost with decreasing results as the workers learn the meaning of "social service" and commence to display their dislike for charity from an employer.

Employers who contemplate the inauguration of industrial relations systems will do well to select a man experienced in the handling of workers, versed in the schemes that make workers content, and one who is both human and efficient.

□ Latest News of the

Capital Now Center of Industry

Big Job Is Fitting War Needs to Motor Car Industry's Great Machinery

WASHINGTON, Nov. 13—Events circling importantly about the motor car industry have been frequent during the past week. The Priority Board order forbidding use of open-top freight cars for passenger car shipment is still in force and despite vigorous protests from many sources will apparently continue as an active order for an indefinite period. The question of coal is one of the most important and every open-top car is needed for coal haulage.

Matters regarding the steel shortage which has been claimed by the War Industries Board are temporarily adjusted to the satisfaction of all parties by the organization of the official automobile industry committee and the outlining of the duties of the Director of Steel Products by the War Industries Board. H. L. Horning, chairman of the Automotive Products Section, as is told elsewhere in these columns, has had his duties increased and becomes the accredited representative of the War Industries Board on all matters automotive, which means that he will act as the go-between for the War Industries Board and the official automobile industry committee.

This committee, which has established offices in the Munsey Building, will at once begin analysis of conditions in the motor car industry and transmit these findings to Mr. Horning who will in turn take them up officially with the War Industries Board and J. F. Replogle, the Director of Steel Products.

Cabinet makers are required for airplane work; skilled mechanics are needed in ship building plants, and it will only be a matter of time when some means of transferring skilled workers from one plant to another will be necessary. This is a problem that will merit investigation into the methods used in England, where a scheme for transfer of skilled labor has been operated for some time and where labor exchanges conducted by the Government, educate workers as to the requirements of other plants, and arrange for equal or slightly increased compensation, and the cost of

(Continued on page 900)

Ford Offers France 12,000 Tractors

DETROIT, Nov. 13—Henry Ford has offered France 12,000 tractors after 6000 for England have been completed. If

the offer is accepted the American market will not receive any tractors until late next summer instead of in the spring. The tractors are being fitted with lights for night work. Many additions are being made to the plant and production is increasing.

\$18,500,000 G. M. Sales in October

NEW YORK, Nov. 14—The General Motors Corp. in October sold 19,169 cars and trucks, the net sales amounting to \$18,500,000, an increase of approximately \$5,460,389 over the same month last year. The following table gives comparisons:

Cars & trucks sold	Oct. 1917	Oct. 1916	Changes
.....	19,169	12,948	6,221
Net sales.....	\$18,500,000	\$13,039,611	\$5,460,389
Undiv'd pft.	3,325,000	2,324,258	1,000,742

Cash in bank and sight drafts with documents attached at the close of business on Nov. 8 last amounted to approximately \$22,100,000.

Quantity Production on Liberty Motors Soon

WASHINGTON, Nov. 14—The initial batch of Liberty motors will soon be ready. Motors tested out up to this time have been largely produced as individual type units by slow hand processes. Now quantity production is expected to be started. First deliveries will be comparatively small, but the rate of turn-out will be sufficient to take care of the requirements of the United States and also to the Allies.

Strike Holds Up Liberty Engines

BEAVER FALLS, PA., Nov. 15—Three companies here making parts for Liberty airplane engines have been temporarily held up by a strike of 1500 men. They are the Moltrup Steel Co., the Union Drawn Steel Co. and the Standard Steel Gage Co.

DETROIT, Nov. 10—The various factories report that as a whole the central western and southern parts of the country are continuing a demand for cars that is almost normal for this time of the year. It is in the New England, Eastern and Western Coast sections that conditions seem most unsettled, and it is in these sections that the war tax, the Liberty bond issue and war conditions in general seem to have affected the industry most.

In the South the recent demand for light cars—particularly light used cars—has been phenomenal, and the Detroit

Aids International Standards

Delegate to Attend London Conference—Committee Chairmen Resign

WASHINGTON, Nov. 12—Edwin H. Ehrman, factory manager of the Chicago Screw Co., has been appointed a delegate to represent the Society of Automotive Engineers at the International Screw Thread Conference to be held in London, England, in the near future. This is but one more indication of how the Society is working for international standards and an example of how the war is bringing engineering standards of different countries closer together.

Church Resigns

H. D. Church, chairman of the Truck Standards Division of the S. A. E. resigned at to-day's meeting of the Council, held at Society offices in the Munsey Building, due to lack of time to carry on the work. No successor has as yet been appointed.

H. L. Horning, chairman of the Tractor Standards Division resigned that position due to lack of time because of his extra heavy duties as chairman of the Automotive Products Section of the Council of National Defense. No successor has been appointed.

Engineering Lectures

The council voted in favor of what might be designated an extension series of engineering lectures in many cities where there is a good representation of membership, but where the formation of a section would not be warranted. A special committee to further this work was appointed. The council voted as not being in favor of establishing the S. A. E. section in Washington.

Business Conditions

dealers in used cars are daily making shipments to Southern stations that bid fair to clear this market of used Fords. One used-car dealer, the Motor Mart, has shipped four carloads of six Fords each in the last 2 weeks to Warren, Ark., and has a contract to ship twenty carloads by Christmas. Four carloads have been shipped to Knoxville, Tenn.; one to Macon, Ga.; one to Locust Grove, Ga., and one to Charleston, S. C., in the same time. These cars have been sold without sales effort, and would indicate that car manufacturers should im-

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Automotive Industries □

Chapin Heads Road Transport

Committee of Four Will Organize Truck Services on Highways

WASHINGTON, D. C., Nov. 10—The appointment of the Highways Transport Committee is announced by the Council of National Defense. The purpose of the committee is to assist the railroads and other means of transportation in the movement of supplies during the war and to work with the highway authorities to maintain the public roads in shape for such use. The membership of the committee will be:

Chairman, Roy D. Chapin, President, Hudson Motor Car Co.; Logan Waller Page, Director of the Office of Public Roads, U. S. Dept. Agriculture; Henry G. Shirley, Chief Engineer, Maryland State Roads Committee; George H. Pride, President, Heavy Haulage Co., New York City.

The membership of the committee insures a broad knowledge of all problems pertaining to the construction of highways and the traffic over them. Co-operative work will be at once started with the various departments of the Government interested in the utilization of the roads of the United States for military purposes.

Harry Ford on Long Vacation

DETROIT, Nov. 15—Harry Ford has left the Saxon company for a long vacation. He remains president and a member of the board of directors. Active management is in the hands of Charles Woodruff, formerly purchasing agent of the Chalmers Motor Co.

900,000 Fords for 1918

DETROIT, Nov. 15—Ford production for the month of October was 79,675. For the last 6 months it has been 469,135. From Aug. 1, 1917, to the present time the orders on hand have never been less than 100,000. The estimated output for Aug. 1, 1917, to Aug. 1, 1918, is 900,000.

Dunham Is Militor Vice-President

NEW YORK, Nov. 10—George W. Dunham, president of the Society of Automotive Engineers, has become vice-president of the Militor Co. of New York. This company will manufacture the Militor motorcycle, formerly known as the Militaire, which was exhibited at the national show here. A plant has been purchased

at Elizabeth, N. J., where production will start very shortly. An annual output of 25,000 machines is being arranged for. The Militor has been developed and built at Buffalo. In speaking of his new connection, Mr. Dunham stated that he was convinced that transportation efficiency in the future lies in the development of the two-wheeled power driven vehicle. In designing the Militor the engineers of this company entirely discarded the diamond frame idea and instead have followed automobile engineering practices. An unique feature of the Militor construction consists of the two 8-in. idler wheels, one on each side of the rear wheel, which can be raised or lowered.

Friend Resigns Mitchell Presidency

CHICAGO, Nov. 15—Otis C. Friend has resigned as president of the Mitchell Motors Co. and is succeeded by D. C. Durland who for the past 23 years has been actively associated with the management of the General Electric Co. Friend has not announced any plans for his future. R. C. Rueschaw, who has resigned as director and sales manager of the Reo Motor Car Co. has been elected vice-president of the Mitchell company.

Erie Plans 1-Tonner

PAINESVILLE, OHIO, Nov. 9—The Erie Motor Car Co. has completed the design of its 1-ton truck and plans to start production at an early date. This truck is constructed throughout of standard units and incorporates a Continental engine, Fuller gearbox and clutch, Torbensen rear and Columbia front axles and Lavine steering gear. It has 127 in. wheelbase and is mounted on solid tires 34 by 3 front and 34 by 4 rear. A starting and lighting system is part of the regular equipment. The price of this truck is not determined as yet but will be announced at an early date.

New Rainier Truck Model

FLUSHING, N. Y., Nov. 14—The Rainier Motor Corp. announces a new model on which quantity shipments will begin the latter part of November. It will be known as model R-4, carrying capacity 2500 lb.; the chassis lists at \$1,340.; wheelbase is 125 in.; bodies are 8 ft. 6 in. behind the seat. Several standard bodies are carried in stock, ranging in price from \$150 to \$250. The rear axle is of the worm drive type with a gear ratio of 8¼ to 1. Clutch and transmission are Brown-Lipe make and the motor is standard Rainier 3¼ by 4½.

The model R-1 Rainier ½-ton worm drive delivery truck will be continued without change.

Will Not Assemble in France

Proposal to Ship U. S. A. Trucks Abroad Knocked-down Refused

WASHINGTON, Nov. 15—A proposal has been made to the United States Government to ship the new U. S. A. war trucks to France partly assembled and assemble them there, thus permitting a saving of approximately \$330,000 on 10,000 trucks, in addition to saving considerable time. The offer which was made by Flint & Co. of New York, a large exporting house, has been turned down by Quartermaster-General Henry J. Sharpe.

The plan of Flint & Co. contemplated the assembly of trucks in a plant at Neuilly Sur Seine and the training of drivers at large plants which the Flint Co. claims to have at its disposal. The Flint offer points out that the shipping displacement of a chassis partly assembled and boxed is 402 cu. ft. whereas under the Flint plan of shipping in knocked-down form, a complete chassis would require only 280 cu. ft. The saving of \$330,000 is based on present shipping freight rates which are \$70 a ton or \$1,600 per chassis; with two weekly sailings of 5000 tons, it would require 25 weeks under the present plan to transport all trucks while under the Flint plan this could be reduced to 6 weeks.

It is also pointed out in the Flint plan that drive-aways from factories here will require the building of service stations en route and assembly and testing plants at the seaboard.

In refusing the Flint offer, General Sharpe stated that if a plan of this character is adopted, such work will be done entirely by the Quartermaster Department and in shops operated by this department. The Flint offer was submitted to many departments and was considered by H. L. Horning, Major Orton, Christian Girl, General Baker and others.

Major Orton has a plan for assembling the trucks and driving a part of them over land loaded with parts exceeding the number normally required for repair work in France and using the extra parts for the assembly of trucks in France.

Ford Confers with War Board

WASHINGTON, Nov. 15—Henry Ford is here to-day in conference with the War Industries Board with a view to ascertaining what the Government wants from him and what he can do for the Government.

Exports Gain 21 Per Cent

33 Per Cent in Trucks and
9 Per Cent in Cars—
\$9,123,048 Total

		1917		1916	
Mos. Cars	Value	Trucks	Value	Parts	
Sept. 4077	\$3,645,280	1251	\$3,675,717	\$1,802,051	
Aug. 3697	3,283,354	838	2,289,307	2,415,554	
Sept. 3585	\$2,810,405	1835	\$5,203,215	\$2,095,188	

WASHINGTON, Nov. 10—Export figures for the month of September show an average gain for that month over August of 21 per cent. Truck shipments featured with a gain of 33 per cent, while passenger car exportations were 9 per cent higher. Truck exports from this country during September numbered 1251, valued at \$3,675,717, as against 838 in August, valued at \$2,289,307. Passenger cars numbered 4077, valued at \$3,645,280, compared with 3697, valued at \$3,283,354 in the previous month.

There is little difference in the number of truck and car shipments during September and the corresponding month of 1916. During September, 1916, 3585 cars valued at \$2,810,405 and 1835 trucks valued at \$5,203,215 were shipped.

Our biggest buyer was the United Kingdom. Her purchases totalled \$2,000,000, which included 682 trucks, valued at \$1,802,813, and sixty-eight cars, valued at \$249,694. French purchases increased nearly \$500,000 over August. France took 188 trucks, valued at \$883,018, and sixty-three cars, valued at \$24,820. Our largest passenger car buyer was Canada, which imported 595 cars, valued at \$553,316. Cuba took 327, valued at \$246,748; Argentina 331, valued at \$230,354, and Chile 294, valued at \$294,827.

Foreign Trade Convention Feb. 7-9

NEW YORK, Nov. 12—The Fifth National Foreign Trade Convention will be held at the Gibson Hotel, Cincinnati,

Thursday, Friday and Saturday, Feb. 7, 8 and 9. This will be a convention of business men of the United States interested in the development of foreign trade and particular interest should attach to this convention because of war conditions and the post-war problems which must be met. The convention last year was held in Pittsburgh and was attended by over 2000 delegates representing several hundred of the most important industries of the country. The convention is being promoted this year, as in the past, by the National Foreign Trade Council, India House, Hanover Square, New York. Last year the representation of automobile industries was not so great as the convention merited. With promise of a war program for January the automobile industry should be very well represented.

May Exhibit Tractors at Next Ford Accessory Show

CHICAGO, Nov. 13—The National Exposition for Ford accessories may stage a tractor exhibition in Chicago next fall. At a meeting of directors of the exposition it was decided to investigate the possibilities of exhibiting tractors in connection with the accessory exhibit. It is planned to change the name of the exposition to "Accessories Market." The financial report of the show indicated that a profit was made. This will not be distributed, however, but will be used as working capital. More than 50,000 persons passed the ticket takers and the sale of tickets amounted to \$2,000.

Used Cars Worth Double in France

NEW YORK, Nov. 12—Used cars are bringing in Paris twice what they cost new before the war, according to advices from that city. Some of the higher priced European car factories are entirely devoted to munitions work, including Rolls-Royce, Renault, Panhard-Levassor and Delaunay-Belleville. A used Rolls-Royce is listed at \$17,000 and some cars run as high as \$27,000. A 20-30 Panhard is valued at \$7,500.

Italy Second Largest Exporter

Ranks Next to U. S. in Automobile Exports—1916 Shipments \$16,835,650

NEW YORK, Nov. 9—Italy is now the second largest automobile exporter, her exports in 1916 amounting to 84,178,250 lires, or \$16,835,650, compared with 507,128,000 lires, or \$101,425,600, exported from the United States in the same year.

Before the war France headed the list of automobile exporting nations followed in order of importance by the United States, with Italy occupying fifth position. Since then conditions have changed. England is third and France fourth. Official figures issued by the finance departments of the various governments show that the value of the motor vehicle exports for the United States, Italy, the United Kingdom and France are as follows for the years 1913 and 1916:

	1913	1916
United States	\$27,029,400	\$101,425,600
Italy	6,836,187	16,835,650
United Kingdom	14,308,200	7,411,748
France	43,501,400	4,002,000

These figures show that America has increased its automobile exports 275 per cent; Italy has increased them 147 per cent; England has decreased by nearly 49 per cent, and France has decreased by nearly 91 per cent.

The growth of the Italian market is interesting. In 1911 the value was \$6,272,785; for 1916 it was \$16,835,650, and for the first 4 months of 1917 it was \$9,435,803, according to figures issued by the Italian ministry of finance.

This business is being done by not more than ten motor vehicle factories, and 80 per cent of it is being handled by the Fiat company, which, with a staff of 23,000 employees, is now the largest automobile producing firm in Europe.

The detailed figures, showing the value

Exports of Automobiles, Trucks and Parts for September and Eight Previous Months

	September				Eight Previous Months			
	1916		1917		1916		1917	
	No.	Value	No.	Value	No.	Value	No.	Value
Passenger cars.....	3,585	\$2,810,405	4,077	\$3,645,280	47,246	\$32,291,633	48,900	\$37,680,143
Commercial cars.....	1,835	5,203,215	1,251	3,675,717	14,773	40,371,055	10,663	26,586,272
Parts, not including engines and tires	.....	2,095,188	.....	1,802,051	.....	17,322,349	.....	21,210,759
	5,420	\$10,108,798	5,328	\$9,123,048	62,019	\$89,985,037	59,563	\$85,477,174
BY COUNTRIES 1917								
	Passenger Cars		Trucks		Passenger Cars		Trucks	
Denmark .....	.....	.....	.....	.....	247	\$223,616	.....	.....
France	63	\$24,820	188	\$883,018	1,158	587,115	1,986	\$5,761,799
Norway	16	17,052	.....	.....	675	712,985	.....	.....
Russia in Europe.....	183	447,690	145	580,897	437	1,045,991	467	1,400,222
United Kingdom.....	68	249,694	682	1,802,813	963	1,243,333	5,820	15,459,675
Canada	595	553,316	62	90,445	13,241	10,114,598	616	843,379
Cuba	327	246,748	.....	.....	2,031	1,722,807	193	622,883
Argentina	331	230,354	.....	.....	2,541	1,702,891	.....	.....
Chile	294	294,927	.....	.....	2,585	2,010,053	.....	.....
British India.....	8	5,876	.....	.....	1,503	1,159,403	.....	.....
Dutch East Indies.....	101	118,272	.....	.....	1,643	1,614,750	.....	.....
Russia in Asia.....	1	1,725	.....	.....	260	419,463	.....	.....
Australia	242	191,462	.....	.....	2,934	2,268,654	.....	.....
New Zealand.....	228	174,864	.....	.....	2,116	1,554,842	.....	.....
Philippine Islands.....	119	109,508	.....	.....	886	678,154	.....	.....
British South Africa.....	168	113,875	.....	.....	2,722	1,942,986	.....	.....
Other Countries.....	1,333	865,097	174	318,544	12,985	8,678,502	1,581	2,398,314
	4,077	\$3,645,280	1,251	\$3,675,717	48,927	\$37,680,143	10,663	\$26,486,272

of both passenger cars and trucks, are as follows:

Year	Trucks	Cars	Total
1911.....	\$447,214	\$5,825,575	\$6,272,785
1912.....	585,916	7,157,236	7,743,152
1913.....	461,094	6,375,093	6,836,187
1914.....	897,505	7,326,934	8,224,439
1915.....	7,166,080	5,510,115	12,676,195
1916.....	14,932,620	1,903,030	16,835,650
1917.....	9,132,620	303,183	9,435,803

It will be noticed that there has been a steady decrease in the value of passenger cars exported and an increase in the value of trucks. As in the case of all other Allied nations, Italy is devoting its energies to the needs of the war and the requirements are for trucks rather than passenger cars. The two most important customers are France and Russia, which have bought motor vehicles as follows:

Year	Number of to France	Number of to Russia
1914	354	120
1915	1889	503
1916	4793	743
1917 (first 4 months)...	1708	1089

Pullman Car to Be Resumed—New Plant and Car

YORK, PA., Nov. 10—L. Goldstein Sons and Michael Levy and his syndicate have come to terms over resumption of operations at the Pullman automobile plant in this city. The Goldsteins, owners of the Pullman franchise, trademark, good will, etc., are putting their extensive resources behind the local plant and the arrangements for a new plant in which to manufacture cars are now in progress.

New Model

The new Pullman car is expected to be on exhibition within the next several weeks. The purchasers of the plant some time ago leased quarters in the Lau building, 133 North George Street, for offices and two large warehouses have been secured for the storage of materials, machinery and supplies. Edwin Letzter, an automobile engineer in the employ of the Goldsteins, has been brought here from Indianapolis to manage the launching of the revived enterprise. New machinery will be added to the equipment and a large force of experienced men will be employed. Many of them will be former employees of the plant. Michael Levy, New York, who with Joseph Frankel purchased the real estate, belongs to a New York syndicate, and it was by Levy's personal efforts that the lawsuit over the trademark, etc., started in Scranton, was brought to an amicable issue.

\$3,000,000 Capital

It is a \$3,000,000 concern that is to handle the Pullman car in the future. The Goldsteins own the American Motor Parts Co., the American Motors Co., the Marion Car Co., the Herreshoff Motor Co., De Tangle Motor Co., the L. P. C. Motor Co., the Enger Motor Co., the Bimel Motor Co., the Alter Motor Co., and the Pullman Motor Car Co., together with a number of mining and smelting concerns which will enable them to furnish much of their own materials.

Machine Tools Seized by Government

600 Worth \$10,000,000 Taken from Warehouses—Some Given to Simplex

NEW YORK, Nov. 10—Six hundred machine tools, valued at \$10,000,000, were commandeered last week by the Government through its Machine Tool Section of the War Industries Board. They were taken from warehouses at various seaports. Some of them were stored for over a year and were destined for Sweden.

Some of these machine tools have been turned over to the Simplex Automobile Co., which has started work on its order for 4000 Hispano-Suiza engines for the Aircraft Production Board.

Government Orders for Curtiss and Thomas-Morse

NEW YORK, Nov. 7—The Curtiss Aeroplane and Motor Co. and the Thomas-Morse Aircraft Co. have been given orders by the Navy Dept. The Curtiss company was awarded a contract for nineteen Curtiss H-12 type machines with power plants, at a total cost of \$597,230. The Thomas-Morse Co. will supply six seaplanes with power plants, at a total cost of \$47,400.

Government Contract for Dunphy Boat

EAU CLAIRE, WIS., Nov. 10—The Dunphy Boat Mfg. Co. has started work on a government contract for thirty-nine motor-driven yawls for the United States Navy, to be used in connection with men-of-war for mine laying and mine sweeping. The boats are being built at the rate of two each week. The Gray Motor Co., Detroit, will furnish the motive units, consisting of double-header gas engines of 10 hp. each. The craft is designed for heavy duty rather than speed, and will be propelled fore and aft. Each boat is 24 ft. long and will weigh about 3500 lb. completely equipped. The construction is of heavy oak ribs and spruce reinforcement. There are 12 airtight compartments along the sides and under the seats. The yawls will be carried on the decks of warships and are equipped with rollers at the bow and stern for rapid movement from decks to water.

Armored Cars on Test Trip

DETROIT, Nov. 8—Three armored cars from the Ordnance Department of the United States Government passed through this city to-day on a test trip from a far eastern point to a city in the middle west. Two of these cars were of the light type, and the third was of the heavy car type, and all were completely equipped as if for war service and were fully manned with a crew of three men—one driver, one machine gun operator, and one extra man.

A heavy commissary truck accom-

panies these three cars carrying the tents and supplies so that the troop is independent and is living under war conditions.

Two of these cars—the light type—are mounted on the standard King chassis. They are fitted with wire wheels and pneumatic tires, the tires on the rear being of the dual type. The heavy armored car is mounted on a White chassis and fitted with disk wheels and solid rubber tires.

Tractors to Relieve Farm Labor Shortage

TOLEDO, Nov. 9—Twelve tractors are being demonstrated at the county experimental farm near Strongsville to show the farmers how they may increase their crops in spite of the labor shortage. The demonstration is being carried on by the county farm extension bureau with the co-operation of the State agricultural departments. Among the machines entered are the Cleveland Creeper tractor, the International, Moline, Avery, Whitney, Huber, Case, Parrott, Beeman and Happy Farmer.

G. M. C. Building War Ambulances

PONTIAC, MICH., Nov. 12—The G. M. C. truck factory here is concentrating on the construction of war ambulances and to date has produced nearly 4000. To care for this work two additions have been made to the factory, and at present the capacity is eighty trucks per day. These trucks are mounted on the standard 1-ton chassis and at present there are orders on hand for about 2000 more. At the same time tractors for the aviation service are being built. These trucks are driven by the regular 2-ton engine mounted on the 1-ton chassis and equipped with 1 and 1½-ton axles, being designed to carry airplane bodies and to tow a trailer on which the wings are carried. About 1700 of these trucks will be built.

Gnome Engine Order for G. V.

LONG ISLAND CITY, N. Y., Nov. 9—The General Vehicle Co. has been given an order for 1000 Gnome engines for airplanes.

Hudson Prices to Advance \$200 to \$300

NEW YORK, Nov. 9—The price of the Hudson car will advance on Dec. 1 from \$200 to \$300, according to the type of body.

Hupp Prices \$100 Higher

NEW YORK, Nov. 13—The Hupp Motor Car Corp. on Nov. 15 will raise its prices \$100 on its Model N. On Nov. 15 the two- and five-passenger models will be \$1,485 and the Sedan \$1,835.

Chalmers Produces 1324 Cars in October

DETROIT, Nov. 13—The output of Chalmers cars in October was 1324, compared with 759 in September. The October production compares with 577 in October, 1916. The September output of 759 compared with 1058 in the corresponding month of 1916.

Henderson-Excelsior Merger

Motorcycle Concerns Will Concentrate Manufacturing in Chicago Plant

DETROIT, Nov. 9—The Henderson Motorcycle Co. has consolidated with the Excelsior Mfg. & Supply Co. of Chicago by an exchange of stock. After Jan. 1 the products of both companies will be manufactured in the Chicago plant and the Detroit factory of the Henderson Motorcycle Co. will doubtless be offered for sale. This plant is practically new, fully equipped, and contains about 65,000 sq. ft. of floor space.

By the consolidation both companies have benefited. The Henderson motorcycle will be manufactured without change and by the consolidation receives a larger factory space, greater purchasing power, and the ability to increase production as much as may be necessary. The Excelsior company has for some time been experimenting with a four-cylinder motorcycle along lines of the Henderson and by acquiring it obtains the perfected design and prestige of the Henderson company.

Many of the Henderson organization will be transferred to the Chicago plant. T. W. Henderson becomes general manager of the combined organization. Fred Mathes, formerly sales manager of the Henderson company, is to be business manager, and W. G. Henderson, now vice-president in charge of engineering, will be engineer of the combined company.

S. A. E. Announces Section Dates

NEW YORK, Nov. 10—The Society of Automotive Engineers has announced dates of future meetings of the sections. The Metropolitan Section will hold a meeting Nov. 15 at the Automobile Club of America. Cleveland will hold its meeting Nov. 16; Pennsylvania, Nov. 22; Buffalo, Dec. 5 at the Statler Hotel; Midwest Section, Nov. 23, at the Chicago Automobile Club. The Tractor Standards Committee will meet Dec. 5 at the Minneapolis Section offices.

Hal-Abbott Merger to Be Decided Nov. 17

CLEVELAND, Nov. 8—Stockholders of the Hal Motor Car Co. and the Abbott Corp. will meet Nov. 17 at the offices of the latter company to vote on the adoption or rejection of an agreement between the two companies for the sale by the Hal company of its entire property and assets to the Abbott company.

Ford Will Not Suspend Manufacture of Passenger Cars

DETROIT, Nov. 13—The report which was published and widely circulated in daily papers last week, to the effect that the Ford Motor Co. would discontinue the manufacture of passenger cars and that the Government had accepted the entire Ford plant to be used for munition work, is without foundation. The Ford

company will continue to build passenger cars and trucks as in the past.

In fact the Ford company has done no more than any other company. Some time ago practically every member of the National Automobile Chamber of Commerce offered its plant to the Government, provided the Government should require it. The Government has not accepted any plants and likely will not do so.

Urges U. S. Board of Aeronautics

NEW YORK, Nov. 13—The Aero Club of America has adopted a resolution urging the appointment of a special United States Board of Aeronautics, the head of which should be a member of the President's cabinet, and asking for a special appropriation of \$1,000,000,000 for emergency aeronautic development. The emergency fleet is designed to consist of large war and transport planes.

Firestone Wins Skirmish in Big Tire Patent Suit

AKRON, Nov. 9—The \$1,000,000 patent suit by Firestone against Goodyear took a new turn Tuesday at Cincinnati when the federal court of appeals there allowed a reopening of the case and sent it back for the hearing of new testimony before the United States district court at Cleveland.

The order followed the discovery by Firestone of a Belgian tire-building machine which it is claimed antedates the Goodyear-State patent. Firestone will be given an opportunity in the Cleveland court to establish its claim that the Belgian machine does antedate the Goodyear invention.

The Goodyear machine, as invented by W. C. State, is claimed by Goodyear as a pioneer invention, and it is alleged that all other machines for building tires constitute an infringement. Royalties are now being paid by many companies.

The Cleveland court a year ago sustained Goodyear and the case went up on appeal.

4 Trans-Continental Highways

Aero Club Approves Routes Starting from the East—Three Others Mapped

NEW YORK, Nov. 10—Four trans-continental airways have been approved by the executive committee of the Aero Club of America. These will be named the Woodrow Wilson Airway, the Wright Brothers Airway, the Langley Airway and the Chanute and Bell Airway.

The Woodrow Wilson Airway will follow a straight line from New York to San Francisco, touching Cleveland, Toledo, Chicago and other important cities on the way to San Francisco.

The Wright Brothers Airway will start from Washington, going through North Carolina, through Georgia, Alabama, Mississippi, Louisiana, Texas, with a station at San Antonio, then through New Mexico and Arizona, ending at San Diego, Cal. The Langley Airway from Washington to Los Angeles is tentative.

The Chanute and Bell Airway extends from Boston to Seattle, touching Albany, New York, Syracuse, Rochester, Erie, Buffalo, Detroit, Grand Rapids, Minneapolis, Bismark, N. D., and Great Falls, Mont., enroute.

The Atlantic Airway will extend from Bangor, Me., to Key West, Fla. The Gulf Airway will extend from Key West to the mouth of the Rio Grande. The Pacific Airway from San Diego to Puget Sound.

Sun Stockholders Sue for \$110,000

CHICAGO, Nov. 12—Further developments in the case of the Sun Motor Car Co., of Elkhart, Ind., which was placed in the hands of a receiver in September, were revealed Saturday, when sixty-one stockholders started a legal battle in the United States District Court here in an

Essential and Non-essential Industries

"TO determine the raw materials which must be imported for war production in this country and for the maintenance of our essential industrial life, involves what we are to produce for our armies and the extent to which normal industries are to go forward during these times, and how far our raw material requirements can be met from our own production. At the same time there must be discussed the great problem of what industries are essential and what are unessential during the war."

"Before a conclusion can be reached as to what is a non-essential industry during the war there must be known what is needed from abroad and what we may

send in exchange, for what is apparently a non-essential here may be productive of most important materials for the war by being sent abroad in exchange for essential materials.

"For example, we need nitrate and copper from Chile. These are essential to the production of munitions of war. We may, however, procure this nitrate and copper by shipping jewelry or automobiles to Chile. Again we need from Argentine wool, wheat and hides and these necessities may be obtained by shipping in exchange sewing machines or typewriters. Thus the manufacture of a limousine or a typewriter may be in fact the means of producing nitrate or wool.—Chamber of Commerce of the United States.

effort to get back some \$110,000 invested in Sun stock.

The lengthy petition filed alleges that Andrews & Co., Chicago brokers, agreed to finance the Sun and was to take more than \$247,000 of the \$250,000 preferred, getting a like amount of common as bonus. It is further alleged that Andrews & Co. failed to turn over the cash in proper manner, and as a result the whole financial mechanism, and the factory organization also, collapsed.

Andrews, when asked about the suit, stated that they have offered to refund to their clients for the Sun stock by issuing them stock whose value is unquestionable, that it was no fault of theirs that the plant was not a success, but was due the inability of makers of motors for the car to deliver. That the brokers are the heaviest losers was presented in a statement by A. M. Andrews, manager of Andrews & Co., who says:

"Financial enemies of ours have been buying up the stock and are using it, I would say, to blackmail us. We lost more than half of all the money lost."

Business Conditions

(Continued from page 888)

diately attempt to develop this Southern field.

The Reo Motor Car Co. reports that it did a larger volume of business in October this year than was done last year in the same time, but that some difficulty is being experienced in obtaining cars for shipment. The Olds Motor Works states that though the demand for cars is less than it was in the spring, materials, and not demand, is the limiting factor in production.

The Government's further schedule of fixed steel prices has tended to a certain extent to relieve the pressure on the material situation. But in spite of this the material situation is bad. Alloy steels are practically impossible to obtain, and the priority ruling permitting plants doing Government work to get first chance at necessary materials complicates matters. One automobile plant in Detroit, having a 600 car per day capacity, and recently working on a 400 car per day schedule, has had to cut down its output to about 250 per day because of the impossibility of obtaining fenders.

If such a thing is possible, the freight car situation is worse now than it has been for some time. The priority board has restricted the use of open cars, excepting flat cars, for automobile shipment, and in some instances cars loaded with automobiles have been unloaded for government use.

Driveaways have relieved the situation somewhat, and for the present, at least, the lake routes are offering another outlet. During the first 4 days of this week the White Star line alone has carried an average of sixty machines per day to Toledo, where they were distributed overland to Ohio, Indiana and Illinois dealers. One company alone plans to ship thirty-five cars daily by this route.

109 M. P. H. a New Record

De Palma in Packard Breaks Chassagne's Mark Made in 1910

NEW YORK, Nov. 10—DePalma, who has been trying for about a month to shatter the world's 6-hr. record in a Packard 12, made another attempt today at the Sheepshead Bay Speedway. He was again unsuccessful in the 6-hr. attempt, but established a new hour record of 109 miles. The best previous time made was that of Chassagne in a 600-cu. in. Sunbeam at the Brooklands track, England, in 1910.

DePalma's best lap was at the rate of nearly 115 m.p.h. But for a tire change, his time would have been around 114 m.p.h. This is the second record DePalma has broken in the past 10 days. Last week in the same car he established a new mark for 10 miles, which he covered in 5 min. 17.4 seconds, or at the rate of 116.48 m.p.h.

During to-day's trials DePalma actually traveled 265 ft. more to the 2-mile lap, thus bringing his average for the hour up to 112.4 miles.

Grand Prize and Vanderbilt Races for San Antonio

NEW YORK, Nov. 10—The Grand Prize and Vanderbilt Cup races will be resumed, if the plans of Clarence Bennett of California go through. Mr. Bennett is planning to hold the two classics in April, 1918, and is now negotiating with the Contest Board of the American Automobile Assn. and the Motor Cups Holding Assn. in regard to getting a sanction and permission to use the cups. San Antonio has been selected for the races. A 9-mile course will be used. The Grand Prize and Vanderbilt races were dropped last year, the previous races being held at Santa Monica in November, 1916. Resta was the winner of the Vanderbilt and Wilcox and Aitken were the winners of the Grand Prize.

Speedway Managers Meeting Nov. 24

NEW YORK, Nov. 12—The Contest Board of the American Automobile Assn. has called a meeting of managers of motor speedways to be held at 501 Fifth Avenue, New York, Nov. 24 to select dates for the 1918 racing season and to make any changes in rules that war conditions warrant.

Permanent Receiver for Eastern Motors

NEW BRITAIN, CONN., Nov. 10—W. J. Larkin, Jr., has been appointed permanent receiver of Eastern Motors, Inc., of New Britain, the concern that was to have built the Charter Oak six, the design of Fred A. Law, formerly of the Electric Vehicle Co. and other companies. The action came about through a suit filed by the Motors Syndicate, Inc., ask-

ing for the appointment of a permanent receiver and the dissolution of Eastern Motors. The former is a Delaware corporation, the latter a Connecticut one. Motion to sell the assets of Eastern Motors was set aside, as it was brought out that an effort will be made to pay the creditors in full. The John J. Roche Co., Hartford, desired that its claim be made a preferred one. This company has the model Charter Oak six fitted with an aluminum body which it was to finish up. The body was built of aluminum in East Hartford. The suggestion of the court was that the Roche company put the car in shape to use. Fred A. Law, who was vice-president and chief engineer of the company which was to build the Charter Oak, is now with the Hartford Buick Co. in charge of the Owen Magnetic department. He was closely associated with Justus B. Entz, who designed the Columbia gasoline electric car built by the Electric Vehicle Co.

Comet Factory Nearing Completion

DECATUR, ILL., Nov. 12—The first unit 150 by 600 ft. of the new factory of the Comet Automobile Co. is being rushed toward completion and will be ready for occupancy about Dec. 15. This will be the most modern structure in the middle west.

Springfield Body Affairs Unfinished

DETROIT, Nov. 10—The Springfield Body Corp., held by the Springfield Realty Co., trustee, is still in the bankruptcy court. To date offers for the plant have been received from many sources, but as yet nothing has been done.

Kent Officials Indicted

TRENTON, N. J., Nov. 9—Frederick H. Clarke, president of the Kent Motors Corp., Henry F. Clarke, treasurer; F. J. Nagel and J. A. Simpson, stock salesmen for the concern, were to-day convicted of misusing the mails in connection with the affairs of the Kent company, capitalized at \$2,000,000. Prior to the finding of the indictments the corporation was forced into bankruptcy. In announcing its verdict the jury recommended that leniency be extended to H. F. Clarke, the treasurer, and J. A. Simpson.

Thomas Auto Truck Co. Bankrupt

NEW YORK, Nov. 9—A lack of adequate working has forced the Thomas Auto Truck Co. into bankruptcy. The failure of this concern has carried with it the insolvency of the Consolidated Motor Corp., an associated concern. The latter concern occupied virtually the same offices as the Thomas company. The taking over by the receiver for the Thomas company of all assets belonging to this subsidiary brought it into bankruptcy. The liabilities of the Thomas company are stated to be about \$21,076 and its assets \$12,878. The liabilities of the Consolidated Motors Corp. are given as \$95,000.

Better Outlook for Securities

Quotations Are Bargains —
Steel Situation Favors
Automobile Concerns

NEW YORK, Nov. 13—Though automobile stocks, with a few exceptions, are weak, the outlook for the future is most favorable. Not because any sudden rise, or bull movement, is looked for, but because of the present low prices. They are considered bargains. Prices are expected to fluctuate, however, as the market is at present governed principally by Government action, and much legislation is expected that will have a potent effect in boosting or depressing prices.

Now that the general opinion is that the automobile interests will be able to get sufficient steel, there has been a more favorable turn to the automobile stock market. This realization undoubtedly has been a factor in the short rally last Saturday. Another important factor in the rise of quotations last Saturday was the report of record sales of Studebaker cars. On the Exchange Studebaker went up to 41½ points, gaining 5½ points. Maxwell and Willys-Overland also advanced, the former jumping a point and a half on the opening sale, and closing at 25, an advance of 4 points. Outside, on the Curb, Chevrolet closed 2 points higher at 59, after having dropped to 50, a new low record early in the session. But the rise of Studebaker was short-lived, because of a repudiation of the statement by A. R. Erskine, president of the company, who stated that Studebaker net profits for the quarter ended Sept. 30 were \$1,165,000, and for

the 9 months' period ended September were \$4,132,000. As a result of the repudiation, Studebaker dropped to 39, but still retained a gain of 3½ points over the previous week.

Chandler was strong at sales around 62, a gain of 4½ points. Reports of big earnings by the Chandler company tended to boost the stock.

DIVIDENDS DECLARED

Republic Rubber Co., a quarterly 1½ per cent on preferred, payable Dec. 1 to stock of record Nov. 20.

B. F. Goodrich Co., quarterly of \$1.75 on the preferred and \$1 on the common. Preferred is payable Jan. 2 to stock of record Dec. 21 and the common Feb. 15 to stock of record Feb. 5.

Kelsey Wheel Co., quarterly of 1½ per cent on preferred stock, payable Nov. 1 to stock of record Oct. 20.

\$2,262,975 Happy Farmer Tractor Orders

LA CROSSE, WIS., Nov. 8—The second annual convention of the Happy Farmer tractor distributors ended here to-day. As a result, the La Crosse Tractor Co. announces the placing of orders and actual shipping specifications for a total volume of \$2,262,975 worth of the Happy Farmer tractors. With the installation of \$75,000 worth of new machinery, already purchased and which is beginning to arrive, the two factories will be crowded to full capacity throughout the entire year.

The price of the Model B tractor will be increased to \$975, while that of Model A remains unchanged at \$685. A 10 per cent wage bonus was distributed to the employees working through to Nov. 1. There are between 300 and 400 employees.

Chandler Earns \$25 Per Share

\$32 Per Share Year's Estimate
—Out of Debt and Has
\$900,000 in Bank

NEW YORK, Nov. 10—The net earnings of the Chandler Motor Car Co. for the 10 months ended Nov. 1 amounted to \$25 a share. This is after allowing for the year's war taxes of \$9.50 a share. The company is out of debt and has \$900,000 cash in bank.

F. C. Chandler, president, in his statement to the stockholders, states that the net earnings of the company before war taxes amounted to \$32 a share. He estimates that for the completed year the earnings per share will amount to not less than \$34.50 a share. After \$13 per share has been paid in dividends this will leave about \$12 per share to be placed to the credit of surplus account.

The usual quarterly dividend of \$2 regular and \$1 extra was declared to-day, rounding out the dividend record for the year.

Jordan Reports Record Shipments

CLEVELAND, Nov. 8—Shipments of the Jordan Motor Car Co. for the week ending Nov. 3 were the largest in the history of the company. Twenty-three cars were shipped on Nov. 2.

The Jordan company in the 24-day period ending Oct. 19 shipped cars valued at \$261,775, and showed a net profit for the month of a little better than 7 per cent. The shipments for October were 27 per cent in excess of October one year ago.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge		Bid	Asked	Net Ch'ge
*Ajax Rubber Co.....	49½	58	— ½	Springfield Body Corp. com.....	..	..	..
*J. I. Case T. M. Co. pfd.....	..	80	..	Springfield Body Corp. pfd.....	..	..	..
Chalmers Motor Co. com.....	2	4	..	Standard Motor Construction Co.....	6½	7½	—1½
Chalmers Motor Co. pfd.....	..	50	..	*Stewart-Warner Speed. Corp.....	46	48	—3
*Chandler Motor Co.....	62	62½	+4½	*Studebaker Corp. com.....	39	39½	+3½
Chevrolet Motor Co.....	57	60	—3	*Studebaker Corp. pfd.....	..	90	..
Curtiss Aeroplane.....	27	26	..	Submarine Boat.....	13	14	— ½
*Fisher Body Corp. com.....	21	30	—2	Swinehart Tire & Rubber Co.....	..	40	..
*Fisher Body Corp. pfd.....	75	80	+5	United Motors Corp.....	15	15½	—2½
Fisk Rubber Co. com.....	45	55	—5	*U. S. Rubber Co. com.....	50	50½	—2
Fisk Rubber Co. 1st pfd.....	100	105	..	*U. S. Rubber Co. pfd.....	95	98	—1
Fisk Rubber Co. 2nd pfd.....	75	85	—10	*White Motor Co.....	35½	38	+ ¾
Firestone Tire & Rubber Co. com.....	99	101	+1	*Willys-Overland Co. com.....	18	18½	— ½
Firestone Tire & Rubber Co. pfd.....	99	101	+1	*Willys-Overland Co. pfd.....	70	73	—4
*General Motors Co. com.....	81¼	81½	—4¼	Wright-Martin.....	7½	7	+ ¼
*General Motors Co. pfd.....	73	75	— ¼	*At close November 12, 1917. Listed New York Stock Exchange.			
*B. F. Goodrich Co. com.....	35¾	36½	+ ¼	OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE			
*B. F. Goodrich Co. pfd.....	90½	98½	—8½	ACTIVE STOCKS			
Goodyear Tire & Rubber Co. com.....	144	148	—1		Bid	Asked	Net Ch'ge
Goodyear Tire & Rubber Co. pfd.....	96	99	—2	Auto Body Co.....	..	10	..
Grant Motor Car Corp.....	2	3	..	Bower Roller Bearing Co.....	24	27½	..
Hupp Motor Car Corp. com.....	2¼	2¾	+ ½	Chevrolet Motor Co.....	57½	54	—8½
Hupp Motor Car Corp. pfd.....	82	88	..	Commerce Motor Car Co.....	..	7	..
International Motor Co. com.....	8	11	..	Continental Motor Co. com.....	5½	5¼	+ ½
International Motor Co. 1st pfd.....	25	50	..	Continental Motor Co. pfd.....	..	..	..
International Motor Co. 2nd pfd.....	15	30	..	Edmunds & Jones com.....	..	..	..
*Kelly-Springfield Tire Co. com.....	39¼	41	+1	Ford Motor Co. of Canada.....	165	..	—3
*Kelly-Springfield Tire Co. 1st pfd.....	75	85	—5	Hall Lamp Co.....	..	..	..
*Lee Rubber & Tire Corp.....	13	14	—1	Michigan Stamping Co. com.....	11¼	..	..
*Maxwell Motor Co., Inc. com.....	22¾	23½	+1¾	Motor Products.....	..	125	..
*Maxwell Motor Co., Inc. 1st pfd.....	51	52½	—3	Packard Motor Car Co. com.....	..	..	..
*Maxwell Motor Co., Inc. 2nd pfd.....	13½	16	— ¾	Packard Motor Car Co. pfd.....	..	19½	..
Miller Rubber Co. com.....	112	120	—8	Paige-Detroit Motor Car Co.....	..	14½	..
Miller Rubber Co. pfd.....	96	100	—2	Prudden Wheel Co.....	..	17½	—2½
Packard Motor Car Co. com.....	120	130	..	Reo Motor Car Co.....	16½	17½	—2½
Packard Motor Car Co. pfd.....	94	97	..				
Paige-Detroit Motor Car Co.....	18	20	—1	INACTIVE STOCKS			
Peerless Truck & Motor Corp.....	9	11	..	Atlas Drop Forge.....	..	35½	..
Portage Rubber Co. com.....	112	117	—3	Kelsey Wheel Co.....	80	88	..
Regal Motor Car Co. pfd.....	10	20	..	Regal Motor Car Co.....	..	26½	..
Reo Motor Car Co.....	17	19	—2				
*Saxon Motor Car Corp.....	5	5¼	..				

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Coal Transportation Facilities Insufficient

During the past week, as in previous like periods, the movement of anthracite coal to Eastern markets has not been sufficient to satisfy the demand. Weather conditions have somewhat interfered with the movement of this fuel to New England. Throughout a large portion of the Eastern states retail dealers are making deliveries of only 1 ton to a customer, and, in many instances, the delivery equipment of these retail dealers is standing idle because coal cannot be secured for delivery. Of course, what coal was contracted for prior to the price-fixing regulations is still moving with fair dispatch, although even this movement has not been sufficient to care for the demand. In many instances, stocks have been depleted almost to the point of exhaustion, while in some cases small stocks have been accumulated. Orders to increase shipments of anthracite to the East are expected shortly. This should tend to quickly relieve the situation. Be this as it may, it is nevertheless the part of wisdom for all consumers to conserve, so far as possible, the supplies on hand, or in prospect, and use as much waste wood and other fuel as may be readily obtainable.

Bituminous Mines Idle

The situation in bituminous coal is rapidly resolving itself into a question of transportation rather than production. In many instances during the recent past, mines all over the bituminous region have been idle a considerable portion of the time on account of a lack of cars. This condition is doubtless responsible for much of the dissatisfaction and unrest existing among the mine workers. It profits a miner little if his price per ton is high and his output is small because his employer cannot get railroad cars wherewith to transport the mine product. The persistent belief exists, however, that the closing of Lake navigation, which should take place next month, will release a considerable amount of motive power and rolling stock which may be advantageously used in transporting coal to the markets where fuel is most needed. There is now little question but that the Northwest will have ample stocks of coal to carry it through a severe winter. Temporary revocation of the Lake priority order has already done much to relieve the stringency in fuel in various localities, and it is believed that the shutting off of this drain entirely will do much to overcome the existing shortage. The local fuel administration in Chicago has resorted to a "card system" in selling coal, not so much to cut down consumption as to forcibly discourage the practice of hoarding. It was found in many instances that customers would urge strong claims upon the dealer concerning their neces-

A New Service

Herewith AUTOMOTIVE INDUSTRIES supplies for the benefit of its readers a general summary of important developments in other fields of business. This is rendered possible by the editorial co-operation of leading industrial publications which are recognized authorities.

By compressing the general industrial situation into this form we hope to give our readers a clear and comprehensive idea of up-to-the-minute developments which they could otherwise secure only with considerable expenditure of time and effort.

sity for fuel and induce him to make a delivery of one or two tons. When this coal was delivered, however, it would be necessary for the truck driver to get into the customer's bin and mow back coal already in place in order to make room for the one or two tons which he was delivering. The card system requires the purchaser to fill out certain blanks, stating his probable requirements and the amount of coal he now has on hand. It is believed that the production of coal is even now ample to the domestic needs of the country if only the output may be justly and equitably proportioned.—*Coal Age*.

Big Automobile Copper Demand Causes Additions to Detroit Mills

DETROIT, Nov. 10.—In order to increase its production capacity to meet the unusually heavy demands from automobile manufacturers, the Michigan Copper and Brass Rolling Mills of Detroit, is building an addition to its plant which will complete a unit of 1000 by 160 ft. in floor space. The new building is of brick and steel construction similar to the other structures of the company and will be completed about Dec. 15.

It is hoped when this new unit is completed to bring the production of the company up to 1,000,000 lb. of thin brass and copper per month. To facilitate this production the plant will be equipped with machinery of improved type provided with every device for the protection of employees. In addition, and that it might better serve the special needs of its customers, the company is adding a laboratory for extensive research work in testing and chemical analysis.

According to Alonzo P. Ewing, general manager of the company, there are orders on the books for three months in advance for thin brass and the renewed activity in the automobile trade is already being reflected in the company's accounts.

Egyptian Cotton Crop Increased

Estimates from the American consul in Alexandria, Egypt, state that the 1917-1918 Egyptian cotton crop will exceed the 1916 mark. It is expected that during that period 6,250,000 cantars of 99 lb. will be raised. This compares with 5,111,080 in the 1916-1917 period.

The American tire manufacturers have been large users of this grade of cotton, but have been forced to use the long staple peeler cotton grown in the United States, on account of the embargo placed by England on the Egyptian cotton. A little over 134,000 bales of 700 lb. of Egyptian cotton are shipped to the United States every year.

Steps are being taken to arrange with the English government for the release of enough of this cotton to relieve the shortage here. It is stated that there is about a month's supply on hand in the United States.

The Sea Island grade of cotton, which amounts to about 100,000 bales a year, is coming through without any delay. About 90 per cent of this crop is used by the American manufacturers.

Coke Price Fixed at \$6

WASHINGTON, Nov. 9.—The automotive industry and allied trades, including those in the castings and forging field, which are large consumers of coke, are favorably affected by the fixing of coke prices at \$6 a ton by the War Industries Board for Connellsville coke in an agreement with steel producers. Though coke has been selling for \$6 a ton in Connellsville for some time, the present price fixing affects the whole country. Prices have been ranging from \$8 to \$15 a ton.

Prices may even go lower, according to information. Government officials are considering this action on account of the low price of coal. Coke prices, according to them, are not equitable with coal prices, and a reduction below \$6 will probably occur.

The latest figures show that the weekly output of coke is running around 639,000 net tons. Including Connellsville, Birmingham, West Virginia, Colorado, Montana and the Northwest are big producers.

No Friction in Steel Adjustment

The adjustment of the steel trade to the new régime in prices and to an increasing diversion of mill products from accustomed channels of consumption is proceeding with less friction than had been expected.

Working continuously, the manufacturers' committee appointed to bring all prices in line with those already fixed, has brought out a new list including bar iron, boiler tubes, nuts and bolts, boat spikes, electric and automobile sheets,

wire rope and pipe skelp, and further announcements are to be made covering screws, railroad spikes and track supplies and a variety of collateral products. Sheet and tin plate extras are about ready and there is yet to come a revision of crucible steel products.

An important feature of the week's new prices is the adoption of a warehouse or jobbing spread of 1c. per pound on sales of plates, shapes, bars and blue annealed sheets and 1½c. per pound on black and galvanized sheets and cold rolled steel.

In a few secondary products, as nuts and bolts, the new prices will mean in some cases a revision of contracts. There has been more or less friction, moreover, over the pleas made by various manufacturing consumers of rolling mill products, for a revision of contract prices. But as long as demand exceeds supply no such readjustments are in sight.—*Iron Age*.

New Willys-Overland 90 Light 4 Sedan

TOLEDO, Nov. 10—The Willys-Overland Co. has announced a new convertible five-passenger Sedan on the model 90 light four chassis at \$1,240. A feature of the body is the arrangement of the doors. The door on the left side of the car opens into the driver's compartment; the one on the right into the rear compartment.

War Trucks Start Road Tests

Continuous Runs of 18 Hr. Per Day for 1 Month Under Severe Road Conditions

WASHINGTON, Nov. 12—Commencing this week, the first two Heavy Duty War Trucks, designed and constructed under the direction of General Chauncey B. Baker of the Quartermaster Corps in collaboration with the Society of Automotive Engineers, will operate steady grinding road tests in continuous runs of 18 hours per day, with two shifts of drivers. These tests will continue for at least 1 month under the direction of H. F. Thomson of the Massachusetts Institute of Technology.

Tests made recently prove, without doubt, that the new trucks have greater power and capabilities than any trucks that have ever been built for war or commercial purposes. The past 2 weeks have been devoted to numerous short and varied tests at points in and near Washington. The first tests, made without modifications of experiments with minor parts, were near Fort Myer, where the trucks were run over heavy clay hills, where in many instances the ground caved in under the wheels.

The next tests taking place on the grounds at Fort Myer were made in a special ditch used for testing purposes and which is 4 ft. deep and 7 ft. wide. The trucks ran into the ditch on one side and climbed up and out on the other side without difficulty, despite the fact that the full load which the truck carried shifted to the rear on the upward climb, thus adding considerably to the actual weight.

Following tests of this nature, all of which have been successful, the Quartermaster Corps commenced tests with parts, using the various parts designed originally for the purpose of determining the very best. For example, the two kinds of fenders, four different magnetos and many different standard carbureters have been tried out in the effort to secure the ones best suited. These tests not yet complete are developing many interesting points.

The trucks originally used 36 in. wheels and one week ago one ran on its power to Philadelphia to secure the first set of 40 in. wheels for test. On the return trip, which was made in 13 hours from 6 p. m. to 7 p. m., the truck, using the 40 in. wheels, passed through a detour of heavy mud and aided many touring cars and other trucks, stalled in the almost impassable road, to a point where they could again use their own power. The 40 in. wheels have been found better than the 36 in. size.

Rubber Hose for Use With Gasoline

(Continued from page 867)

hours, must withstand a minimum internal hydraulic pressure of P pounds per square inch, depending upon the internal diameter D of the hose without showing defects.

D = Internal diameter in inches	Minimum pressure in pounds per square inch (P)
Up to ½ inclusive.....	160
9/16 to 1 inclusive.....	140
1 1/16 to 1 ½ inclusive.....	120
1 9/16 to 2 inclusive.....	100
Above 2 inclusive.....	80

Chemical Properties.—No organic matter other than Para or plantation rubber shall be used in the preparation of this hose. The percentage of rubber shall not be less than 32 per cent. The amount of free sulphur in either the tube or the cover shall not exceed 1 per cent.

A three-inch piece of the hose after having been placed in an air oven at 132 deg. C. for 2 hr., must show, when cool, no tendency to crack, and must not be tacky. The specific gravity of the gasoline used in this test should be between 0.710 and 0.725 at 60 deg. Fahr.; 65 per cent of it must distill at over 100 deg. C. from a distillation flask when the bulb of the thermometer is just below the side tube. A 14 in. length of the hose is held vertically and plugged at the bottom. The upper end is fitted with a glass tube about 18 in. long. The hose so arranged is filled with gasoline to a head of 12 in. above the top of the acting length of the hose. The acting length of the rubber hose is 12 in. The upper end of the glass tube is loosely closed with a cork.

During the first 24 hr. the level of the gasoline will fall comparatively rapidly. The loss of gasoline is made good by frequent additions from a known volume of gasoline, care being taken that the level of the gasoline in the glass tube does not fall at any time by more than three inches. The test is to last for 72 hr., and the loss of gasoline during the third 24 hr. must not exceed 100 c.c. per square foot of the original internal surface of the hose.

A three-inch piece of the hose is boiled for one hour (using a reflex condenser) in gasoline similar to that used for the

Permeability Test. The gasoline is allowed to cool down. Twenty-four hours later the test piece is removed from the gasoline and examined without delay, as follows:

The internal diameter at the point of greatest constriction is measured by means of rod gages. From this measurement the area of the bore is calculated. It must not differ from the original by more than 25 per cent. The test piece is then cut longitudinally into halves, and the adhesion between rubber and cotton carefully examined. The adhesion must be of such a character that the rubber can only be stripped from the cotton by hand with difficulty.

A three-inch piece of the hose is immersed in "Vacuum A" or other oil (approved by Purchasing Office) at a temperature of 100 deg. C. for 8 hr., and for a further period of 24 hr. at ordinary temperature. The oil is then wiped from the surface of the hose. The decrease of internal diameter shall be less than 10 per cent. The flexibility and elasticity of the rubber must not be diminished and there must be no tendency of the rubber to separate from the cotton.

The purchaser will decide where the tests are to be carried out. All test specimens are to be cut in the presence of the inspector and they are to be marked as he may direct.

For the purpose of testing, a representative sample will be cut from each 1000 ft. of hose or fraction thereof, and the tests will proceed in accordance with the Purchasing Office's instructions.

If any sample fails to comply with any of the above tests, the hose represented thereby will be rejected. Accepted and rejected material must be marked as directed by the inspector.

The contractor must bear the cost of the depreciation in value of any rejected material due to test pieces being cut therefrom.

The contractor must not supply any material which has previously been rejected by any Government Department, without giving full written particulars of the previous rejection to the inspector who is inspecting to this specification.

Akron-Biltwell Tire & Rubber Co. Formed

AKRON, Nov. 12—The Akron Biltwell Tire & Rubber Co. has incorporated for \$200,000 to manufacture automobile tires, tools and accessories. Preferred stock to the amount of \$250,000 and common stock to \$50,000 is being issued. M. Braley is president and general manager; Wm. M. Graham, vice-president, and J. F. Risch, secretary and treasurer.

AMARILLO, TEX., Nov. 10—The Texas Tractor & Farm Machinery Co. has been incorporated with \$10,000 capital by J. R. Merriwether, P. F. Gruver and T. B. Hill, Lockney, Tex.

READING, PA., Nov. 10—The Reading Chassis & Motor Corp. has been formed in New York State to build motors, cyclecars, automobiles, etc. The capital is \$100,000. The incorporators are S. S. Shears, Brighter Hotel, Reading; C. W. Bliss and E. Cahn, 233 Broadway, New York.

CARSON, NEV., Nov. 13—The Turbine Muffler Mfg. Co. has been incorporated in San Francisco with a capital of \$50,000 to manufacture automobile parts. The directors are R. C. Savage, J. G. Ellis, William Muller, Joseph Smythe and P. B. Ellis of Carson City.

Electric Welder Reorganized

LANSING, MICH., Nov. 13—The Electric Welder Co. has reorganized and re-capitalized in order to carry out an increased production and distribution plan. H. F. Harper is president of the reorganized concern and James J. Carey, L. Clyde Smith, Frank E. Fisher, Harry M. Lee are directors. This company moved to Lansing about a year ago and in addition to manufacturing electric support welders also makes an electric starter for Ford cars. At present its production is devoted almost exclusively to the starter for Fords and reorganization involves an extended merchandizing campaign.

Goodyear Protects Its Rubber Supply

AKRON, Nov. 13—The Goodyear Tire & Rubber Co. is conducting an investigation of rubber plantations in the far east and has obtained concessions on 20,000 acres near Medan Sumetra for the purpose of protecting its own rubber supply. Rubber from this plantation is now rapidly coming to the factory in constantly increasing quantities.

New Source of Rubber Found

CARACAS, VENEZUELA, Nov. 7—A new source of rubber has been found in the forests of Hevea at the headwaters of the Orinoco and the Rio Negro rivers. Dr. Henry Pittier, botanist, states that there are large forests of the Para rubber tree in this region. The Hevea, or Para tree, is known to be by far the

New Companies Formed

Latest additions to ranks of Automotive Industries

MILWAUKEE, WIS., Nov. 10—Another gun manufacturing company has been formed in this state at the behest of the Government. It is the Four Lakes Ordnance Co.

TORONTO, ONT., Nov. 9—Ignition Repair & Supply Co. has been incorporated with a capital of \$40,000 to manufacture batteries, magnetos and other accessories. L. J. Pashler is one of the incorporators.

ST. LOUIS, Nov. 13—The Truck, Tractor & Mfg. Co. has been incorporated with a capital of \$25,000 to manufacture. The incorporators are I. M. Jacobs, Kansas City, Mo.; N. B. Gregg, Jr., and others of St. Louis.

SOUTH ORANGE, N. J., Nov. 13—The National Auto Accessories Co., capitalized at \$50,000, has been formed to manufacture. Jerome C. Beck and Roy Choen are the incorporators.

most important of all the rubber-bearing trees of the world. There has been much waste and destructive tapping of the wild trees in the upper Amazon, and the center of Hevea production has begun to pass to the East Indies, where extensive plantations have been established in the last 20 years. Professor Pittier says they are getting rubber in northern and central Venezuela from the Mierandra genus, one closely allied to Hevea. Labor conditions prevent much planting of rubber in Central and South America in competition with cheap coolie labor and easy living conditions in the East.

Government Urges Overland Travel by Automobile

WASHINGTON, Nov. 10—The movement toward overland travel for motor-driven apparatus as an aid to the movement to conserve the transportation facilities of the railway lines is being encouraged by different branches of the government, and announcement now is made that four hospital companies and four field hospitals from the medical training camp at Fort Benjamin Harrison, Indiana, will go overland to Fort Ogelthorpe, Ga.

Two of the ambulance companies and two of the hospital units will be motor driven.

Eagle Two-Stroke Airplane Engine Tested by Government

NEW YORK, Nov. 12—Information comes from Washington to the effect that one of the six-cylinder two-stroke aircraft engines manufactured by the Union

Dual Carburetor Incorporates in Cleveland

CLEVELAND, Nov. 10—The Dual Carburetor & Mfg. Co. has been formed with a capital of \$100,000 to manufacture carburetors. A plant will be built shortly. G. F. Hart of the Guardian Savings & Trust Co. is in charge.

CHICAGO, Nov. 10—The Service Motor Supply Corp. has been formed with \$207,000 capital stock to succeed the Service Motor Supply Co. The new corporation is under new management and has no connection with the old company.

TORONTO, ONT., Nov. 10—The Dominion Battery Co., Ltd., 736 Dundas Street E., is a new Canadian company in which Canadian capital has been invested for carrying on the manufacture of dry batteries, flashlights, etc. Those whose names are mentioned in connection with the company are C. W. Moody, of Hamilton, Ont., and James Dickson of the Dominion Power Co. and Transmission Co. W. M. Turnley has been appointed manager, with E. G. Fuller factory superintendent.

DETROIT, Nov. 13—The Lincoln Motors Co.'s plans are well under way, the chief difficulty being in obtaining machinery. It is hoped that production on airplane engines may be started in 3 weeks.

Gas Engine Co. of San Francisco was recently subjected to a 48 hr. official test at the Aeronautical Testing Laboratory, which was successfully completed. At the end of the trial the run was continued until a total of 54 hr. was reached, when the engine was shut down on account of a falling off in the oil pressure, which upon dismantling was found to be due to a gasket in the lubricating system having blown out. It is stated that the output throughout the test was above the normal rated power of the engine.

National Junk Dictator for Waste Reclamation

WASHINGTON, Nov. 14—There is a movement on hand to appoint a National Junk Dictator who would co-ordinate many of the activities looking to the furtherance of thrift at this time and to direct the nation's energies in the matter of waste reclamation as applied to the mass of material usually known as junk. It has been conservatively estimated that the annual amount of business done in the various branches of the waste material industry totals more than \$1,500,000,000.

Harroun Shipping Cars

DETROIT, Nov. 13—The Harroun Motors Corp. shipped twenty-five cars last week and expects to manufacture seventy-five this week. Approximately 300 completed engines are on hand. The material is coming in well and the labor market is good.

Rueschaw Resigns—Akers Reo Sales Manager

LANSING, MICH., Nov. 9—R. C. Rueschaw has resigned as sales manager of the Reo Motor Car Co. Forest H. Akers, assistant sales manager, will succeed him. Akers has been with the Reo company for several years, first as traveling district supervisor and latterly as assistant sales manager.

E. C. Morse is representative of the Willys-Overland factory in Washington, co-operating with C. W. McKinley, engineer of the Willys-Overland, Inc. Morse was formerly vice-president and general manager of the Chalmers Motor Co.

John Sturgess has joined the engineering staff of the Stanley Motor Carriage Co., Newton, Mass. He was for many years with the Platt Iron Works Co., Dayton, specializing on power plant design and construction. He formerly organized and managed the Sturgess Engineering Co., engaged in similar work. E. Stanton has been appointed purchasing agent of the Stanley company, to succeed F. J. Maurer.

C. A. Woodruff is general manager of the Saxon Motor Car Corp., having resigned as purchasing agent of the Chalmers Motor Co. some time ago.

James M. Crawford, formerly assistant chief and designing engineer of the Chalmers Motor Corp., has been appointed chief engineer of the Allen Motor Co., Fostoria, Ohio. Clyde C. Cox, who was associated with Mr. Crawford, has been made assistant engineer. Mr. Crawford also has supervision over the inspection department, which is directly under Chief Inspector H. J. Elwert, formerly of the Timken and Continental plants.

J. S. Fickling, formerly vice-president and superintendent of the Fickling Enameling Corp., Long Island City, has received a commission as first lieutenant in the quartermaster's department and has been ordered to report at Washington preparatory to being placed in charge of a repair unit, leaving for France at an early date.

W. S. Jewell, well known salesman in New York, is leaving the Studebaker New York branch for Philadelphia, having purchased an interest in the Quaker City agency of this car.

J. P. Hunting of the MacAvoy agency is general traveling representative of the General Asbestos & Rubber Co., Charleston, S. C. Harris Pickett, formerly of the MacAvoy agency, is advertising manager of the General Asbestos company and will take up his duties in Charleston.

David H. Bellamore has been appointed manager of export sales by the O. Armleder Co., Cincinnati.

Men of the Industry

Changes in Personnel and Position

Holland Joins Philadelphia Storage Battery Co.

PHILADELPHIA, Nov. 13—Walter E. Holland, for 10 years chief electrical engineer of the Edison Storage Battery Co., Orange, N. J., has joined the Philadelphia Storage Battery Co., this city. Mr. Holland has had broad experience in the design and application of storage batteries for electric passenger cars and trucks, having held the positions of research engineer of the Anderson Electric Car Co., Detroit, and Pacific Coast representative of the Walker Vehicle Co., Chicago, and of the Elwell-Parker Electric Co., Cleveland.

D. L. Watson is manager of the new Haynes factory service branch, Detroit, having resigned as assistant general manager of the Haynes Automobile Co., Kokomo.

A. R. Kroh has joined the Selden ranks as Western division sales manager of the Selden Truck Sales Co., Rochester, N. Y., with headquarters at Chicago, Ill. In addition to becoming the guiding spirit of the Selden-Chicago Truck Sales Co., Mr. Kroh will have supervision of Selden dealers in Illinois, Wisconsin, Minnesota and North and South Dakota. The Selden company will establish headquarters at Chicago, where D. Lloyd Smith, in charge of the motor truck research department, will also be located. Mr. Smith for the past 2 years has been the sales engineer, but by reason of the establishing of the Western department, his duties will be added to, and in addition to his present work he will also become the head of the research department, which will come under the direct supervision of sales director, H. T. Boulden.

L. M. Baker is sales manager of the United Motors Service, Inc. He was formerly sales representative of the Standard Steel Spring Co., Coraopolis, Pa.

Arthur H. Hertz has been made factory sales representative on the Pacific coast for the O. Armleder Co., Cincinnati. His headquarters will be 112 Market Street, San Francisco.

R. H. Daniels has become manager of the export department of the Goodyear Tire & Rubber Co., Akron, succeeding J. C. Macfadyen, who has left the company to engage in business for himself. About a year ago Mr. Daniels was appointed assistant manager of the department of which he is now manager.

Stratton Concentrates on Body Manufacturing

CHICAGO, Nov. 10—G. W. Stratton has severed active connection as vice-president of the Harry-Newman-Stratton Co., Maxwell, King and Hal distributor. He will devote his entire time to the G. W. Stratton Co., of which he is president and which produces bodies for trucks, trailers, taxicabs. The Harry Newman-Stratton Co. will continue to distribute the Maxwell, King and Hal, Newman becoming president and general manager.

A. F. Knoblock has become works manager of the Cleveland Tractor Co., Cleveland, maker of the crawler or track-laying tractor developed by Rollin H. White. Mr. Knoblock is a pioneer in the automobile field, having been one of the founders of the Northway Motors Co. some 16 years ago. Later he became identified with the Cole Motor Co. as vice-president and general manager.

Lloyd Harris, president of the Russell Motor Car Co., Toronto, Ont., at the request of the Imperial Munitions Board will represent the board in Washington.

Harry Pike, George H. Lovell, C. D. Ford and C. G. Taylor have been added to the selling force of the Marmon Automobile Co., New York, which has just taken possession of its new show rooms at 1880 Broadway. Pike is one of the pioneer salesmen in the automobile industry, having started in this business when automobile row was below Forty-second Street. In 1913 he went to Boston as manager of the Chalmers branch and later returned to New York, selling both Mitchell and Chalmers cars. Lovell has been associated with Carl H. Page forces in the sale of Mitchell and Jordan cars. Ford and Taylor are also veterans, the latter being one of the executives of the A. Elliott Ranney Co., which at different times acted as distributor for the Hudson, King and Daniels cars.

Fred H. Robbins, for several years with the Overland Buffalo Co., but more recently with the Howard B. Smith Co., Buffalo, as vice-president, has resigned and has associated himself with the William M. Coon Co., Buffalo distributor of the Stearns-Knight.

G. V. H. Cairns is sales manager of the McCarthy Motor Sales Co., Detroit Ford dealer, 291 Dix Avenue. He was formerly district sales manager of the Saxon Motor Car Co.

Herman T. Kraft, formerly with the airplane department of the Goodyear Tire & Rubber Co., is airplane engineer in France with the air squadron.

H. M. Robinson, of Dodge Brothers, is chairman of the foreign trade committee of the Detroit Board of Commerce.

Women Replacing Men in Maxwell Plant

DETROIT, Nov. 9—At the Oakland Avenue plant of the Maxwell Motor Co. women are largely replacing men in certain branches of the work. At present about thirty-five women, or to be exact, girls, are employed as drivers around the plant. These girls take the cars after they have passed the final inspection, drive them to the warehouses or to the loading docks, or do any necessary driving around the plant. The wages they receive for this class of work is the same as that formerly paid to the male drivers, and their work is proving entirely satisfactory.

Maxwell and Chalmers Sales Under One Roof in Detroit

DETROIT, Nov. 12—The L. J. Robinson Co. which in the past has distributed Chalmers car exclusively will in the future also handle the Maxwell. A large force of salesmen will be placed in charge of the Maxwell sales and a separate truck department will be organized.

This move gives Detroit two Maxwell dealers, the Cunningham Auto Co. continuing the sale of Maxwell as formerly.

However, due to the increasing demand for trucks the Cunningham company has greatly enlarged its truck department and in the future the majority of its salesmen will concentrate on truck sales. In training the former passenger car salesmen to become truck salesmen, it has been found advisable to put them through the Maxwell truck assembling plant on Oakland Avenue in order that they may thoroughly understand its construction and operation.

The Cunningham company has organized a sales campaign whereby the city has been blocked into sections and each section is being worked off by the week and new sections are to be canvassed until the city is thoroughly covered.

Due to the fact that practically all truck sales are cash sales, the Cunningham company is urging its dealers throughout the state to concentrate largely on truck sales. For the present the Maxwell service will be handled by the former service station at 10 West Warren Avenue.

Chicago Representation Changes

CHICAGO, Nov. 10—Dealer representation in this territory has undergone several changes during the week. Louis Geyler, who has handled the Elgin in this territory for the present, is giving it up and is taking on the Dort. The factory sales offices of the Elgin will distribute that car in this territory. The Dort agency was left open when Otto C. Owen, who has been selling the Dort and the Liberty, retired from the field. No information as to Liberty sales has been given out.

The James Levy Co., handling the Chalmers, has acquired the local distribution of Buick, operating under the Chicago Buick branch. At the present time

Current News of Factories

*Notes of New Plants—Old Ones
Enlarged*

Levy operates in conjunction with other big dealers in the city.

New Accessories for Jorgenson

WAUPACA, WIS., Nov. 10—The Jorgenson Mfg. Co., Waupaca, is preparing to manufacture and market a number of new automobile accessories and specialties, in addition to its standard line of engine primers, orders for more than 20,000 of which are now being filled. The company also has developed a carbureter which utilizes the heavier grades of fuel and this is being manufactured on a commercial basis. The new goods may not be marketed until spring, as much delay has been encountered in procuring necessary tools and other equipment.

Eagle to Develop Tractor Department

APPLETON, WIS., Nov. 10—The Eagle Mfg. Co., Appleton, Wis., which engaged in the manufacture of tractors a year or more ago, and previously was a large producer of gasoline engines, farm machinery, etc., has increased its capital stock from \$200,000 to \$500,000 in order to develop the tractor department and bring the output nearer to the rapidly growing demand. While plans are still in embryo, it is known that the company intends to erect extensive additions to its plant, which now covers approximately a half-block in Appleton, and will install much new machinery and equipment.

200 McCord Radiators Per Day

DETROIT, Nov. 12—The McCord Mfg. Co. has equipped its plant so that 200 radiators per day can be turned out for government work if necessary. At present considerable government orders are on hand for radiators, part of which are for the standard Government truck and part of which go to truck manufacturers that are filling Government orders. Some time ago a gasket manufacturing plant was constructed at Wyandotte and at present a power plant is being built at the Detroit factory.

Dodge Distributer for Syracuse

SYRACUSE, Nov. 10—The C. F. Gilmour Co. has been formed here to distribute Dodge Bros. cars. H. R. Bliss, vice-president and general manager of the Colt-Stratton Co., New York, is president of the company, his associates being C. M. Bishop of Bishop, McCormick & Bishop, Brooklyn Dodge dealer; H. A. Bonnell, Newark, N. J., Dodge dealer, and C. F. Gilmour, formerly sales manager for J. A. Cramer, Dodge dealer in Buffalo.

Racine Foundries May Be Compelled to Shut Down

RACINE, WIS., Nov. 10—Foundries at Racine are in danger of being deprived of the source of supply of molding and core-making sand because residents along the shore of Lake Michigan at that point have made a protest that the removal of sand from the beach is resulting in the washing away of embankments. Since the government placed an embargo upon the use of open top cars for the shipment of sand and other materials, the twenty-one large casting shops in Racine have been obliged to resort to the use of lake sand for core-making. Unless they are privileged to continue to take sand from the beaches it is declared that the foundries may have to close down. The matter is under consideration by the common council.

Packard Branch Advertising Managers Convene

DETROIT, Nov. 7—The branch advertising managers of the Packard Motor Car Co. are holding a convention here today for the purpose of discussing dealer advertising. Representatives are present from New York, Chicago, Cleveland, Philadelphia, Pittsburgh and all the larger centers. The Packard company is preparing an advertising campaign from the dealers' angle and the purpose of the convention is to obtain a first-hand knowledge of what is desired.

Hartford Machine Screw Adds

HARTFORD, Nov. 10—The Hartford Machine Screw Co. has made large additions to its plant, which now comprises over 200,000 sq. ft. of floor space. The company manufactures Master spark plugs and power-driven tire pumps as well as a long list of screw machine products.

Schatz Bearings for South America

POUGHKEEPSIE, N. Y., Nov. 10—The Federal Bearings Co., Inc., Poughkeepsie, has recently closed a contract for Schatz "Universal" annular ball bearings with a European house that has branches in several South American countries. The initial order calls for a large Latin American shipment.

Aeronautics Taught at Goodyear Factory

AKRON, Nov. 12—The Goodyear Tire & Rubber Co. has started a factory school for the purpose of instructing its employees in aeronautics. This course will occupy 2 evenings a week and will incorporate a considerable amount of mathematics. For this reason all applicants must have a high school course or its equivalent and a small tuition fee is required to cover necessary expenses. This course was deemed necessary, as the Goodyear company is manufacturing a large amount of material for the signal corps, and hence its employees if specially trained would be of great value to the Government.

Capital Now Center of Motordom
(Continued from page 888)

moving where the workers are willing to be transferred. The English plan also considers the labor-turnover, that problem that is now so costly to American employers, and undertakes to reduce it by giving workers who with just cause quit their work, what is called an honorable discharge which entitles them to immediate work at any plant requiring labor. A worker without an honorable discharge cannot obtain a new position for 6 weeks following his leaving.

Transportation is now coming in for serious consideration and the new Highway Transport Committee, headed by Roy D. Chapin, will play an important part in the movement of military supplies. Plans are under way for the utilization of air, water, electricity, steam and motors for transportation and the near future will no doubt witness the completion of an exhaustive scheme whereby the various transportation committees will arrange for movement of

supplies by thousands of motor trucks and aircraft in addition to steam and electric roads and water-ways.

Washington is now the center of gravitation for all important individuals of the motor car industry. A week suffices to present in the capital, practically every member of the different companies. During the past 7 days the following men were among some of those who visited the city on war business:

Henry Ford, Frank Klingensmith and John R. Lee of Ford Motor Co.
John N. Willys, Willys Overland Co.
Walter Chrysler, Buick Motor Co.
Hugh Chalmers, Chalmers Motor Co.
E. R. Gardner, Velie Motor Corp.
C. W. Nash, Nash Motors Co.
J. Willis Stephenson, Indiana Motor Truck Corp.
C. A. Kaess, Automobile Crank Shaft Corp.
R. C. Sykes, Troy Wagon Works.
R. P. Proege, Buda Co.
F. B. Davis, Rock Island Plow Co.
V. L. Brown, Sterling Motor Truck Co.
F. W. Magin, Industrial Comptroller Co.
C. B. Little, Smith Motor Truck Corp.
B. Gramm, Gramm-Bernstein.

Howard L. Spohn, U. S. Ball Bearing Co.
T. A. Aspell, B. F. Goodrich Co.
W. M. Ingalls, Eclipse Machinery Co.
C. A. Crique and A. N. Church of the Sterling Engine Co.
R. W. Jessup, Wayne Wheel Co.
A. T. Murray, Bethlehem Motors Corp.
J. V. Whitbeck, Chandler Motor Co.
B. F. Wright, S. F. Knowles, Federal Motor Truck Co.
E. C. May, Pierce-Arrow Motor Car Co.
W. J. Urquhart, Cleveland, Tractor Co.
H. W. Bigelow, Hartford Auto Parts Co.
G. B. Knisler, Knisler-Bennet Co.
G. A. McComb, Hartford Auto Parts Co.
C. A. Dana, C. W. Spicer, Spicer Mfg. Co.
J. E. Douglas, Signal Motor Truck Co.
G. Warrington, Campbell Wyatt & Cannon Foundry Co.
G. Kranz, National Malleable Castings Co.
Roy Chapin, Hudson Motor Car Co.
R. W. Collins, Cadillac Motor Car Co.
R. H. DeMott, SKF Ball Bearing Co.
F. D. Tobin, C.A.S. Sales Co.
J. D. Ripley, Fisk Rubber Co.
George P. Wray, U. S. Light & Heat Corp.
H. Murphy, Pest-O-Lite Corp.
J. O. Eaton, Torbensen Axle Co.
H. T. Mitchell, DuPont Fabrikoid Co.
H. G. Farwell, Raybestos Co.

Calendar

ASSOCIATIONS

1917

Nov. 24—New York, Speedway Managers' Meeting at Offices of Contest Board of American Automobile Assn. to decide on 1918 dates.

1918

Jan. 3-4—New York Automotive Electric Assn. meeting.

RACING

Nov. 17—Phoenix, Ariz., Two Races for Arizona Cars and Drivers at Arizona State Fair.

SHOWS

Nov. 12-17—Los Angeles, Cal., Motor Car Dealers' Assn., Billy Sunday Tabernacle.
Nov. 12-18—Denver, Col., Automobile Trade Assn., Show Committee, Auditorium. G. A. Wahlgreen, Mgr.
Dec. 3-8—Akron, O., Akron Auto Show Assn., Auditorium Armory. O. G. Armstrong, Mgr.

1918

January—Kalamazoo, Mich., Kalamazoo Automobile Dealers' Assn., Armory.
Jan. 2-9—New York, Salons, Automobile Salon, Inc., Astor Ballroom. John R. Eustis, Mgr.
Jan. 5-12—New York Show, Grand Central Palace, National Automobile Chamber of Commerce.

Jan. 11-19—Philadelphia, 17th Annual Show, Philadelphia Auto Trade Assn., Commercial Museum Bldg.

Jan. 11-19—Providence, R. I., R. I. Licensed Auto. Dealers' Assn., State Armory. Percival S. Clark, Mgr.

Jan. 19-26—New York Motor Boat Show, Grand Central Palace, National Assn. of Engine and Boat Manufacturers.

Jan. 19-27—Cleveland, Seventeenth Annual, Cleveland Automobile Show Co., Wignmore Coliseum. Fred. H. Caley, Mgr.

Jan. 19-28—Montreal, Can., Montreal Automobile Trade Assn., Ltd., Almy Bldg. T. C. Kirby, Mgr.

Jan. 21-26—Manchester, N. H., Academy. Couture Bros.
Jan. 21-26—Scranton, Pa., Scranton Motor Trades Assn., Armory. Hugh B. Andrews, Mgr.

Jan. 23-28—Allentown, Pa., Lehigh Auto. Trade Assn., Traylor Motor Co.'s Garage. P. W. Leisering, Publicity Mgr.

Jan. 26-Feb. 2—Chicago National Chow, Coliseum and Armory, National Automobile Chamber of Commerce.

Jan. 26-Feb. 2—Chicago, Salons, Elizabeth Room of Congress Hotel.

Jan. 26-Feb. 2—Harrisburg, Pa., Capital City Motor Dealers' Assn., J. Clyde Myton, Mgr.

February—Peoria, Ill., Peoria Auto and Accessories Dealers' Assn., W. O. Ireland, Mgr.

Feb. 9-16—Bronx, N. Y., 2d Battery Armory, Bronx Automobile Dealers' Assn. D. J. Barrett, Mgr.

Feb. 11-16—Toledo, Terminal Auditorium, Toledo Auto Show Co.

Feb. 11-16—St. Louis, Mo., St. Louis Auto Mfrs. & Dealers' Assn., Robert E. Lee, Mgr.

Feb. 11-16—Kansas City, Mo., Third Annual National Tractor Show.

Feb. 16-23—New York, Second Pan-American Aeronautic Exposition, Grand Central Palace and Madison Square Garden.

Feb. 18-23—Grand Rapids, Mich., Automobile Business Assn., Klingman Building. Ernest T. Conlon, Mgr.

Feb. 18-23—Newark, N. J., N. J. Auto Exhibition, Co. G. First Regiment Armory. Claude E. Holgate, Mgr.

Feb. 18-23—Des Moines, Ia., Des Moines Automobile Dealers' Assn., Coliseum. C. G. Van Vleet & Dean Schooler, Mgrs.

Feb. 18-23—Springfield, Ohio, Springfield Auto Trades Assn., Memorial Hall. C. S. Burke, Mgr.

Feb. 18-23—Waterbury Conn., United Shows Co.
Feb. 18-24—San Francisco, Cal., San Francisco Dealers' Assn., Exposition Auditorium. G. A. Wahlgreen, Mgr.

Feb. 18-25—Pittsfield, Mass., State Guard, State Armory. James J. Callaghan, Mgr.

Feb. 18-27—So. Bethlehem, Pa., Fourth Annual (cars 18-23; trucks 25-27), Coliseum. J. L. Elliott, Mgr.

Feb. 22-March 9—Brooklyn, N. Y., Brooklyn Motor Vehicle Dealers' Assn., Twenty-third Regiment Armory. I. C. Kirkham, Treas.

March—San Francisco, Cal., Motor Truck Dealers of San Francisco, Auditorium. Ivan R. Gates.

March 1—Lyons, France, Third Sample Fair.

Mar. 19-24—Cedar Rapids, Ia., Cedar Rapids Auto Trade Assn., Auditorium.

Apr. 9-13—Stockton, Cal., San Joaquin Auto Trade Assn. Samuel S. Cohn, Mgr.

Sept. 23-28—Chicago, National Accessory Show for Fords, Coliseum.

S. A. E.

Nov. 16—Cleveland Section Meeting.

Nov. 22—Pennsylvania Section Meeting.

Dec. 5—Buffalo Section at Statler Hotel.

Nov. 23—Mid-West Section at Chicago Automobile Club.

Dec. 5—Tractor Standards Committee Meeting at Minneapolis Section offices.

Engineering

American Railway Master Mechanics' Assn.
American Institute of Electrical Engineers.
Master Builders' Assn.
American Society of Heating and Ventilating Engineers.
Association Iron and Steel Electrical Engineers.
Mining and Metallurgical Society of America
Society of Automotive Engineers.

NOVEMBER

15—Mining & Met. Soc. Amer. section at Engrs. Club.
15-16—Soc. Naval Arch. & Marine Engrs. annual meeting.
17—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.
19—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

DECEMBER

1—Assn. Iron & Steel Elec. Engrs. monthly meeting Phila. section.
8—Assn. Iron & Steel Elec. Engrs. monthly meeting Cleveland section.
10—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ill. section at Chicago.

Illuminating Engineering Society.
National Electric Light Assn.
National Gas Engine Assn.
American Society for Testing Materials.
American Institute of Metals.
American Foundrymen's Assn.
Society Naval Architecture and Marine Engineers.

11—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Mich. section at Detroit.

13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Penn. section at Phila.

13—Amer. Soc. Heat. & Vent. Engrs. monthly meeting Ohio section at Cleveland.

15—Assn. Iron & Steel Elec. Engrs. monthly meeting Pittsburgh section.

17—Amer. Soc. Heat. & Vent. Engrs. monthly meeting New York section.

20—Mining & Met. Soc. Amer. Monthly meeting New York section at Engrs. Club.